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Bibliography on Ozone (1954–1959)

June 1959 No. 6

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 10 JUNE 1959 No. 6

SPECIAL FEATURE IN THIS ISSUE

Bibliography on Ozone (1954–1959)

By

Mary L. Rice and Geza Thuronyi

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ring to the attention of meteorologists current literature in their field.

Part I contains abstracts of current literature in the fields of meteorology, etc.

Part II of each issue comprises an annotated bibliography of important references on a ecial subject (usually arranged chronologically).

Bibliographies published in the successive issues were:

Vol. I, 1950

Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm
Condensation Trails	10. Clim. of N. E. Africa	11. Mountain Met.	Detect.

Vol. III, 1952

Clim. of N. W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V. 1954

Oceanog. Met.	2. Clim. of S. E. Asia	3. Auroral Physics	4. Tropopause
Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.		3. Storm Surges
Ionospheric Prop.	5. Photochem.—Upper Atmos.		6. Cloud Physics
Radar Cloud Physics	8–9. Atmos. Nuclei	10. Weather Modification	11. Cooling Power

Vol. VII, 1956

Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
Snow Micromet.	8. Snow Micromet. (Suppl.)	9–11. Tropical Cyclones

Vol. VIII, 1957

Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecast. (Suppl.)
Albedo 8. Meteors	9–10. Tropospheric Prop.	11. Medical Meteorology

Vol. IX, 1958

Radioastronomy	2. Solar Astrophysics	3. Radioactivity in Atmosphere
Waves and Currents	5. Physical Oceanog.	6. Dynamic & Phys. Oceanog.
Long Range Forecast.	8. Radar Met. 9. Cosmic Rays	10–11. Geomagnetism

Vol. X, 1959

1. Works of C. E. P. Brooks 2. Tornado forecasting 3. Soil Moisture 4. Sferics
6. Ozone

Other bibliographies in preparation are:

Actinometers	*High Atmosphere Temperatures*	*Singularities*
Evaporation	*Micrometeorology*	*Synoptic Aerology*
Frost	*Radiation*	*Thunderstorms*

Part III contains a listing of reviews, translations, reprints, and the contents of important iblications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue mprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where t material may be found. The Union List of Serials (Gregory) is the source of most of t symbols used. In some cases, where no symbol has been assigned to a library, one will devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by char

Geographic locations are in the English form rather than the form used locally, for examp Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherw stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to t Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months a abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numb (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (V 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

10.6–1 551.521.1:620.9(08)

Akademiia Nauk SSSR. Energeticheskiĭ Institut, **Ispol'zovanie solnechnoĭ energii, bornik 1.** [Utilization of solar energy; Collection 1.] Ed. by V. E. Baum. Moscow, kademiia Nauk SSSR, **1957.** 247 p. tables, figs., refs., eqs. **DWB** (621.47 B347is Vol. 1)—his collection of papers on the utilization of solar radiation is, according to the editor, the rst attempt to consolidate in one place the existing knowledge on the status of solar energy tilization and the future development of solar technology. Theoretical aspects of the problem, escriptions of apparatus and of their operation, and economic aspects of solar energy are urveyed. While the work on this problem carried out outside of the U.S.S.R. is considered, rincipal attention is devoted to the work of the solar laboratory of the G. M. Kryzhanovskiĭ nergetics Institute of the Academy of Sciences of the U.S.S.R. Each of the twenty papers abstracted separately. (For listing of contents, *see* Pt. 3, p. 1314, Oct. 1958, *MAB.*) *Subject leading:* **1. Solar energy utilization.**—*I.L.D.*

10.6–2 551.464(265)

Akademiia Nauk SSSR. Institut Okeanologii, **Issledovaniia Kurilo-Kamchatskoĭ padiny i severo-zapadnoĭ chasti Tikhogo okeana.** [Investigations of the Kurile-Kamchatka epression and of the northwestern Pacific Ocean.] Its *Trudy*, Vol. 27, **1958.** 368 p. figs., ables, bibliogs. Pertinent articles abstracted separately. **DWB**—This large monograph ontains 7 detailed articles on water masses and ocean currents, hydrochemistry, plankton nd bottom fauna of the Kurile-Kamchatka depression and the northwestern Pacific. The ork is a result of the complex oceanographic expedition of the "Vitiaz" in the Kurile-Kamhatka region in 1953 and in the Northwestern Pacific in 1954–5. The articles constitute a ontinuation of those published in Volume 12 of the same series. (For listing of contents, e Pt. 3, p. 465, March 1959, *MAB.*) *Subject Headings:* **1. Oceanographic chemistry of orthwestern Pacific 2. Marine biology 3. "Vitiaz" Expedition, 1953–55 4. Kurile-amchatka depression 5. Northwestern Pacific.**—*M.R.*

10.6–3 551.510.535:523.7

Akademiia Nauk SSSR. Komissiia po Issledovaniiu Solntsa, **Fizika solnechnykh korpuskuliarnykh potokov i ikh vozdeĭstvie na verkhniuiu atmosferu zemli.** [Physics of solar orpuscular currents and their effect on the upper atmosphere of the earth.] Moscow, Akaemiia Nauk SSSR, **1957.** 289 p. figs., refs., eqs. All articles abstracted separately. **DLC** QB531.A5)—A collection of 20 articles (presented at a conference held at Moscow on Nov. 2–24, 1955 by the Commission on Solar Research) on various aspects of the effect of solar orpuscles on the earth's atmosphere, solar and geomagnetic field, ionosphere, aurora, airglow, osmic rays, etc. Methods of measurement (photometry, radio, propagation spectrometry), nterpretation of spectra and theoretical models deduced from studies are discussed in conection with the 5 sessions. IGY stations for such studies are shown on maps and the hopes or progress during IGY expressed in many of the articles. *Subject Headings:* **1. Solar corpuscular influences on upper atmosphere 2. Solar-ionospheric relationships.**—*M.R.*

10.6–4 551.501.7:551.507.362:629.12(02)

Bates, David Robert (*ed.*), **Space research and exploration.** [rev. enl. ed.] N. Y., Villiam Sloane, **1958.** 287 p. 21 figs., 21 tables, bibliogs., eqs. **DWB** (629.1388 B329sp)—series of articles on rockets, space flight, cosmic ray and meteor hazards outside the atmos-

phere, earth satellites, manned satellites, space navigation, medical and biological problems and conditions on the moon and planets. Each article is written by a British expert in th field: D. R. Bates, Patrick Moore, A. C. Clarke, L. R. Shepherd, M. W. Ovenden H. S. W. Massey and others. Articles are somewhat technical in nature, and are supplemente by charts, tables, drawings and reference lists. (For abstract on first edition of 224 p., pul London, 1957, *see* 9.1–2, Jan. 1958, *MAB.*) *Subject Heading:* **1. Space flight.**—*M.R.*

10.6–5 551.58(08

†California. Univ. Scripps Institution of Oceanography, La Jolla, **Proceedings [of the Conference on recent research in climatology, Scripps Inst. of Oceanography, La Jolla, Calif March 25–26, 1957.** Ed. by Harmon Craig. Issued by Committee on Research in Wate Resources, Univ. of California. 121 p. figs., tables, bibliog. p. 117–121. **DWB** (M8 C153co —This volume contains the full texts (and figs., etc.) of fifteen papers covering the subjects c climatological implications of studies of naturally occurring isotopes in the atmosphere an sea, glacial and post-glacial climatic history, atmospheric radiation balance and the effec of carbon dioxide upon climate. The conference proceedings are dedicated to the memor of C.-G. Rossby who was a pioneer in the field of meteorological applications of isotope analys and had a major part in the organization and conduct of the conference. (For listing c contents, *see* Pt. 3, p. 311, Feb. 1959, *MAB.* All articles abstracted separately.) *Subje Headings:* **1. Climatology research. I. Craig, Harmon** (*ed.*).—*G.T.*

10.6–6 551.574.7:629.1

†North Atlantic Treaty Organization. Advisory Group for Aeronautical Research an Development, **Icing problems and recommended solutions.** Ed. by Edmond A. Brun. Pr sented to the Flight Test Techniques and Instrumentation Panel of AGARD, July 195 Amendments up to Nov. 1957. *AGARDograph*, Paris, No. 16, Nov. **1957.** 264 p. fig (incl. photos), bibliogs. throughout. Text in English and French. Contents: Brun, E. A **General survey (of icing problems, including brief remarks on aeroplane icing and defensiv measures against it),** p. 1–69. (97 refs.) Fraser, D. and Pettit, K. G., **Icing conditions to b considered in the design of protection systems,** p. 71–91. (14 refs.) Rendel, D. G. A. an Bigg, F. J., **Measurement of icing conditions,** p. 93–156. (40 refs.) Morrison, R. B.; Nichol J. A.; Cullen, R. E. and Stubbs, H. E., **Icing wind tunnel tests,** p. 157–227. (19 refs.) Abe G. C. and Thompson, James K., **Flight tests in simulated icing conditions,** p. 229–246. Thom son, James K., **Icing flight test concepts,** p. 247–264. **DWB** (629.1323 N864a)—This report the result of a cooperative effort of representatives of Canada, France, the United Kingdom an the U. S. Each chapter was discussed by several participants and information on which co plete agreement could not be reached was eliminated. The principal objects of the investig tion were a) standardization of measuring devices and test techniques, and b) basic informatio necessary for the development of means of protection. Brun gives a theoretical survey of th mechanics and the thermodynamics of icing and reviews literature on aircraft icing and pr tection against it. Fraser and Pettit investigate atmospheric icing conditions from a st tistical point of view. Rendel and Bigg describe instruments (their calibration and install tion on aircraft) for measuring such parameters as liquid water content, droplet diameter an air temperature. Morrison et al., discuss various types of available wind tunnel facilities an different refrigeration cycles. Finally, Abel and Thompson report flight test made in ici conditions produced by means of water spray. *Subject Headings:* **1. Icing of aircraft. I. Bru Edmond A.** (*ed.*).—*G.T.*

TEXTBOOKS

10.6–7 551.521.64(0

†Jelley, J. V., **Čerenkov radiation and its applications.** Published for the United Kingdo Atomic Energy Authority. New York, Pergamon Press, **1958.** 304 p. figs., tables, biblio (p. 289–296), eqs. Price: $10.00. **DWB.** Review by E. P. Hincks in *Science*, Was D. C., 129(3358):1273, May 8, **1959.**—The first thorough review in book form of the theoretic experimental and applied aspects of this peculiar form of radiation named Čerenkov radiati after its discoverer. The field is narrow but touches on nuclear physics, optics, high frequen

dio techniques, astrophysics and cosmic rays. The faint, bluish-white light, given off by ansparent objects in proximity to radioactive sources, was first noticed in 1910 by MADAM URIE, was studied by L. MALLET in 1926–1929, but was not identified and explained until 34–1938. Applications to measurement of speed of high energy particles, night airglow, smic rays, etc. arose from the use of the photomultiplier and the resulting scintillation counter. eneration of microwaves by Čerenkov radiation is also considered. The photomultiplier d Čerenkov detectors are treated in detail. Optical considerations, design of counters, Čenkov radiation in the atmosphere, gas counters and miscellaneous aspects are treated in veral chapters. Light pulses from the night sky were discovered during cosmic ray shower 1953. *Subject Headings:* **1. Čerenkov radiation 2. Night airglow Čerenkov radiation Cosmic ray Čerenkov radiation.**—*M.R.*

10.6–8 551.5:629.13(02)

Johnston, Harvey, **Weather ways.** 2d ed. Toronto, Meteorological Branch, Dept. of ansport, **1957.** 128 p. numerous figs. **DWB** (M:629.13 J72we)—The 1952 edition of this ll-illustrated (with schematic drawings) text on elementary meteorology for pilots has been vised slightly to include a few new ideas such as the Three Front Model used in surface and per air analysis in Canada, and new knowledge of thunderstorms, new cloud nomenclature d other details of upper air observation time prescribed by the WMO. Chapters cover mospheric clouds, pressure, wind, moisture and temperature, stability and vertical motion, masses, fronts, cold front weather, warm front weather, upper fronts and trowals, clouds, ecipitation and fog, visibility, icing, thunderstorms, turbulence, precipitation, static, escially as applying to Canada. (For abstract on 1953 ed., *see* 7.5–5, May 1956, *MAB.*) *bject Headings:* **1. Aeronautical meteorology textbooks 2. Meteorology for pilots.**—*M.R.*

10.6–9 551.58(02)

†Kendrew, W. G., **Climatology.** London, Oxford Univ. Press, **1957.** 2d ed. 400 p. 1 figs., tables, bibliog. p. 384–385. Price: 42 sh. 1949 ed. was "3rd" ed. of his **Climate. LC** (QC861.K5). Review by H. H. Lamb in *Meteorological Magazine*, London, 87(1036):315, t. **1958.** Review in *Weather*, London, 13(6):205, June **1958.**—This second edition of the st widely known textbook on climatology has been revised and reset, with "many minor d a few major changes," particularly with respect to upper air climatology. The simple tline arranges the 41 chapters into 6 major parts: I. Insolation and temperature; II. Pressure d winds; III. Moisture, cloud, sunshine and visibility; IV. Mountain and plateau climate; Weather of the westerlies and VI. Climatic types. A new section in Ch. 16 (Pressure and nd belts) gives a full treatment of the major features of the jet stream (p. 166–172), its ation to surface relief, surface weather, the tropopause, etc. especially over North America. per air sounding by radar, rocket and radiosonde are touched on. A number of recent blications are included in the recommended reading list (his own works on the climate of nada (1955-1956) being the latest mentioned). The synoptic charts used for illustrating ather types, and the climatic charts, graphs and photographic plates, are well chosen though turally elementary for this type of a work. (There are 6 more figures than in the 1949 ed.) or 1st ed., *see* 8–108, Aug. 1950, *MAB.*) *Subject Heading:* **1. Climatology textbooks.**—*M.R.*

10.6–10 551.5:656.61(02) 551.46(02)

§Krauss, Joseph and Stein, Walter, **Wetter- und Meereskunde für Seefahrer.** [Meteorgy and oceanography for mariners.] 4th ed. Berlin, Springer-Verlag, **1958.** 206 p. 102 s., cloud photos (fold. in pocket), tables, bibliog. p. 166. **DWB, DLC.** Price: DM 19.50. st edition issued by Krauss in **1917** under title **Grundzüge der maritimen Meteorologie und eanographie.** 2d ed. (with Prof. Meldau) appeared **1931.** 3d ed. (with Stein), **1952.** view by B. F. Bulmer in *Institute of Navigation, Journal*, 12(2):219–220, April **1959.**—The 52 (3rd) edition of this practical textbook for mariners and navigators is further revised to lude about 35 pages of new material on radar hurricane location, facsimile weather charts, noptic reporting and storm tide warning services, use of upper level charts and knowledge he jet stream and meteorological navigation. The general approach is not for meteorologists to serve as a manual for reference or study on: 1. General meteorology, weather and

observations; 2. Meteorological laws; 3. Basic laws controlling weather; 4. Winds and wi systems; 5. Extratropical storms; 6. Waterspouts and hurricanes; 7. Physical oceanograph waves, currents, etc.; 8. Weather networks and services for mariners; 9. Plotting weather ma on shipboard; 10. Forecasting on shipboard; 11. Navigation and ice navigation. Appendic give wind scales and tables for calculating humidity, cloud heights, etc., and charts of clou (in color) and ocean currents. (For abstract on 3d ed., *see* 5A–55, Jan. 1954, *MAB.*) *Subj Headings:* **1. Marine meteorology textbooks 2. Oceanography textbooks 3. Meteorologic navigation. I. Meldau, H.**—*M.R.*

10.6–11 551.509.33(0

†Kats, Abram L'vovich, **Predskazanie pogody na tri-sem' dneĭ.** [Weather forecasti three to seven days in advance.] Leningrad, Gidrometizdat, **1958.** 131 p. 32 figs., 65 ref eqs. **DLC** (QC995.K3 1958). First ed., 1950, pub. under title: **Prognozy pogody maloĭ zabl govremennosti.** (Not abstracted by *MAB*)—A practical and informative pamphlet (30 copies) setting forth the current methods of extended forecasting used in the U.S.S.R., with co parison with methods used by NAMIAS in the U. S. and BAUR in Germany. The 7 chapte discuss, with ample illustrative charts of basic topography, etc.: I. Baric principles and stu of large scale weather patterns; II. Principles of synoptic types and natural synoptic perio III. 3-day forecasts; IV. 4–5 day forecasts of upper level and surface baric topography; V. 5 day forecasts of upper and surface baric fields; VI. Forecasts of special weather such as c waves in Central Asia, or freezes in the Ukraine; VII. Examples of 3–7 day analyses and fo casts of general circulation types. *Subject Headings:* **1. Extended forecasting textboo 2. Soviet forecasting techniques 3. U.S.S.R.**—*M.R.*

MONOGRAPHS AND COMPREHENSIVE PAPERS

See also: **Atmos. stress on sea surface** (Kajiura), 10.6–72; **Hygrometric tables and charts,** 10.6–110; **Weathering of plastics** (Barrett), 10.6–113; **Upper air wind data, E. Germany,** 10.6–133; **Vertical wind shear** (Dvoskin, Sissenwine), 10.6–229; **Past climate and continental drift** (Ma), 10.6–290.

10.6–12 551.546(9

Makerov, Iu. V., **Osnovnye cherty gidrologicheskogo rezhima antarkticheskikh v** [Basic features of the hydrological regime of the Antarctic waters.] *Moscow. Gosuda vennyĭ Okeanograficheskiĭ Institut, Antarktika,* Vol. 2, **1956.** 103 p. 18 figs., 19 tables, 73 re **DLC** (GB397.M6)—The first volume on the Antarctic gave a thorough survey of the clim and meteorology of the Antarctic Continent. The present volume on the basis of expediti up to 1953, covers the hydrography and oceanography of the Antarctic seas: I. annual hyd logic characteristics; 1) boundaries, 2) bottom relief and depth; 3) major influences on curre waves, salinity, density, temperature, etc.; 4) spatial variation in these characteristics; 5) te poral variations in elements; 6) circulation of waters. II. types of water in Antarctic; 1) ba influences; 2) types of water; 3) surface waters; 4) depth waters; 5) intermediate wat III. ice in Antarctic waters; 1) sea ice; 2) continental or glacial ice. A good bibliography a a large number of oceanographic cross sections are appended, and a large number of tabu and graphic data charts. (For Vol. 1, *see* 8.3–12, March 1957, *MAB.*) *Subject Headin* **1. Antarctic oceanography 2. Antarctic seas.**—*M.R.*

10.6–13 551.589.1:551.515(

*Bürger, Kurt, **Zur Klimatologie der Grosswetterlagen: ein witterungsklimatologisc Beitrag.** [Climatology of large scale weather situations: a contribution to synoptic cli tology.] *Germany. Deutscher Wetterdienst, Bericht,* 6(45), **1958.** 79 p. 2 figs., 36 tab numerous tables in appendix. **DLC, DWB**—A major monograph presenting an extens compilation of data on frequency, annual variation, temperature, cloudiness, precipitati and other aspects of large scale weather circulation types and patterns in Germany. Volu nous data sheets and graphic presentations are included. The study is based on punched c decks for 1890–1950 (minus 1945). Data on the individual weather elements (e.g., temp ture) are compiled for Berlin, Bremen, Karlsruhe, and Munich. Elaborate statistical analy

e included and discussed. Five year means, anomalies, interdiurnal variations, frequency frost and ice days are also included. *Subject Headings:* **1. Grosswetterlagen climatology Large scale weather types 3. Germany.**—*M.R.*

10.6–14 551.589:551.513

Vangengeĭm, G. Ia., **Opyt primeneniia sinopticheskikh metodov k izucheniiu i kharakristike klimata.** [Application of synoptic methods to the study and characterization of imate.] Moscow, Gidometeorologicheskoi Sluzhby, SSSR, **1935.** 109 p. maps, figs. ibliog. p. 109 (26 refs.) **DLC** (QC878.V3). Transl. into English by Long Range Research nit of Weather Div. of Army Air Forces. 135 p. carbon of typescript. Available for ref. **WB** (M8 V253ap)—Extensive discussion and illustration of principles of the MULTANOVSKII hool of synoptic climatology or schematic representation of synoptic processes; classification id identification of 22 typical circulation systems and resulting weather types, and a detailed scussion of the various "cold type" and "warm type" intrusions into the U.S.S.R. Interasonal and intraseasonal associations or relations between weather types are considered, the final chapter, with many tabular and graphic presentations based on 42 years of synoptic arts. *Subject Headings:* **1. Synoptic climatology 2. Circulation types 3. Translations U.S.S.R.**—*M.R.*

10.6–15 551.577.37(94)

Institution of Engineers, Australia, Stormwater Standards Committee, **First report on ustralian rainfall and runoff.** (Sydney?), **1958.** 69 p. numerous figs., charts, tables, 36 fs., eqs. Mimeo. **DWB** (M79.4 I59re)—Extensive analysis in the form of charts, nomoams and discussion of heavy rainfalls in Australia, with rainfall intensity-frequency-duration ta for each provincial capital for 1 to 100 yrs return period. Constants C and n are shown isarithm charts for each state. (C and n are constants and coefficients in formula $=C/(t+b)^n$ for determining the "once a year" rainfall intensity). The constant b is arbiarily set at 5.0 for all stations. Values of S, the standard deviation of the logs of the primary infalls, are also shown graphically. Flood design criteria are also worked out graphically. *ubject Headings:* **1. Rainfall intensity-duration-frequencies 2. Floods, Australia 3. Australia.**—*M.R.*

10.6–16 551.579.4(931)

New Zealand. Soil Conservation and Rivers Control Council, **Floods in New Zealand, 20–1953, with notes on some earlier floods.** Wellington, N. Z., **1957.** 239 p. 35 figs., bles, 15 maps (fold. in pocket) **DWB** (M79.4 N532fL)—The voluminous data on floods in ew Zealand have been compiled from departmental reports, from flood reports compiled catchment boards and from newspaper files. It is an expansion of a previous report comled by the Meteorological Service for the period 1920–30. A few floods prior to 1920 are corded. Floods are described chronologically under each of 11 districts of North Island d 6 of South Island. Wherever rainfall and synoptic weather data or information are ailable they are included, and about 30 photographs are presented to show extent of floods, mage and other effects. Flood hydrographs, rainfall maps and other meteorological data e included in the 24 diagrams in the body of the report and 12 in the appendix. Sixteen trict maps (folded in the pocket) show dates and places of extreme floods or rains. A timepth scatter diagram (1 min–1 year) shows extreme rainfall values, places and dates for fferent return periods for New Zealand and for the world. *Subject Headings:* **1. Floods, ew Zealand 2. Flood statistics 3. New Zealand.**—*M.R.*

10.6–17 551.515.2:551.577.11(75/76)

Schoner, R. W. (*Hydromet. Sec., Hydrologic Services Div., U. S. W. B.*), **Characteristic d generalized isohyetal patterns for Gulf and East Coast hurricanes.** Wash., D. C., U. S. eather Bureau, Oct. 16, **1957.** 18 p. 42 figs., 3 refs. **DWB** (M15.2 U587ch)—Hurricane cipitation is defined as that which falls from 24 hrs before to 48 hrs after a hurricane crosses e coast. The 72-hr period is divided into three 24-hr periods: 1. pre-hurricane, 2. hurricane, d 3. post-hurricane precipitation. Data for most hurricanes from 1887–1956 were analyzed d the patterns described for the following areas: I. Texas coast; II. Middle Gulf Coast;

III. East Gulf Coast; IV. Florida East Coast; V. South Atlantic Coast; and VI. North Atlan Coast. Factors affecting the precipitation amounts and patterns are: topography, coastli orientation, direction of motion, speed and intensity of storm, and extra tropical weath systems. No one pattern could be found for any region to indicate a possible hurrica precipitation model. Charts show for each region the general motions and patterns and tho of selected (unusual) storms. *Subject Headings:* **1. Hurricane rainfall patterns 2. Ea Coast, U. S. 3. Gulf Coast, U. S.**—*M.R.*

10.6–18 551.587(73,729,79

*Ratner, Benjamin (*Office of Climatology, U. S. W. B.*), **Upper-air climatology of the U. S Pt. 2, Extremes and standard deviations of average heights and temperature.** *U. S. Weath Bureau, Technical Paper*, No. 32, Pt. 2, Sept. **1958.** 140 p. entirely tables and charts (5 **DWB** (M(055) U587t)—Pt. I contained average height, temperature, relative humidity, a density for constant pressure surfaces in the U. S. and Caribbean, based on 0300 GMT rad sonde data for 1946–1956. The present volume gives the extreme values and standard d tribution of the daily values around the monthly averages for 950, 850, 700, 500, 300, 150 a 100 mb surfaces for 60 stations in tabular form, charts for January, April, July and Octob for the same levels for height contours, standard deviation and extreme values of height a temperature and, finally, absolute extreme elements for Continental U. S. and for ent network of stations for each month and level (in tabular form). (For abstract on Pt. 1, 9.3–11, March 1958, *MAB*.) *Subject Headings:* **1. Upper air climatology data 2. Upper temperature extremes 3. Standard deviation of upper air temperatures 4. United Stat** —*M.R.*

10.6–19 551.508.822:551.524.7(7,988) 551.508.822:551.557(7,98

Lowenthal, Marvin J., **High-altitude radiosonde flights, July 1955, Pt. 3.** *U. S. Sign Corps Engineering Labs., Ft. Monmouth, N. J., Technical Memorandum*, No. M-1933, Dec. **1957.** 77 p. 25 figs. **DWB** (M08.812 U586s)—In order to get high altitude meteorologi data of vital interest to rocket designers and engineers, special experimental radiosonde ballo were used during July, 1955, at 8 stations including 3 new stations: Long Beach, Calif., Pd land, Ore., and Denver, Colo., and the stations previously (August, 1954; *see* 8.4–25, Ap 1957, *MAB*) used: Narsvarssuak, Greenland, Goose Bay, Labrador, Belmar, N. J., Patr AFB, Fla. and Chanute AFB, Ill. Mean temperature data are tabulated for 1000, 700, 5 400, 300, 250, 200, 150, 100, 80, 50, 40, 25, 20, 15, 10, 9, 8, 7, 6, 5, 4, 3 and 2 mb (all stati reached 5 mb) and actual data for each level for each ascent presented *in extenso*. Gra give standard deviations as well as values of temperature, zonal winds along 120°W and 70° 24 hour temperature changes, mean winds, isotherms for North America at several levels, *Subject Headings:* **1. High altitude radiosonde flights 2. Upper air temperature data 3. Up air wind data 4. North America 5. Greenland.**—*M.R.*

10.6–20 551.501.45:551.556:629.13 551.

Graystone, P., **Equivalent headwinds at heights of 30,000 feet and 40,000 feet along routes.** *Great Britain. Meteorological Office, Meteorological Reports*, 3(20), **1958.** 35 map folded, numerous tables, 3 refs. **DWB**—Tables give equivalent headwinds for pla flying 400 kn (300–500 kn) over about 500 air routes distributed throughout the earth, heights of 30,000 and 40,000 ft, in Jan., April, July and Oct. The values are given to wh knots for the flight to and for the return flight from the terminal indicated, and the stand deviation. The data are calculated by the indicated method from the mean vector wind at midmonth of each season and the standard vector deviation of wind at points on the ro (obtained from charts put out by the Meteorological Office, 1950). This report supplem the former which gave winds for 10, 20, 30, and 40,000 ft. *Subject Headings:* **1. Equival winds at high levels 2. Air route climatology 3. World.**—*M.R.*

POPULAR METEOROLOGY BOOKS

See also: **Shackleton's Antarctic expeds.** (Fisher, M. and J.), 10.6–57.

10.6–21 551.510.42(023)

Adler, Irving, **Dust.** Illus. by Ruth Adler, N. Y., John Day, **1958.** 122 p. **DLC** QC882.A3)—Importance of dust, both as a "friend and a foe," nature, sources, properties, ffect on light (day, night, sunset), measurement, effect on weather and climate, volcanic dust, he Ice Ages, dust and the soil, crops and dust storms, erosion, dunes; living organisms as ust, spores, molds, mosses and ferns, bacteria, pollens; air pollution and health, city and ndustrial dust, silicosis, hay fever, allergies, smog; cosmic dust, meteors, space dust are dis-ussed briefly with schematic diagrams and sketches. A subject index is included. *Subject Headings:* **1. Dust 2. Popular science books.**—*M.R.*

10.6–22 551.581

Aubert de la Rue, Edgar; Bourlière, François and Harrow, Jean-Paul, **The tropics.** N. Y., Alfred A. Knopf, **1957.** 208 p. 16 colored plates, figs. **DLC** (QH84.5.A813). Transl. rom original French, **Les tropiques,** pub. Paris, **1954.** 206 p. **DLC** (QH84.5.A8). Review f English transl. by Marston Bates in *Geographical Review,* 48(3):449–451, July **1958.**—The ich variety in tropical climates is emphasized in this large, beautifully illustrated, book on ropical life (animal and vegetable). The factors of altitude, variable rainy seasons, distance rom sea or mountains, atmospheric and oceanic circulation anomalies mask the general ltitudinal influence so that the climate, and hence vegetation, presents the appearance of a nosaic with often abrupt transitions from one type to another. The first chapter takes up he plant environment, with most of the discussion devoted to tropical climates (equatorial, ropical desert, and mountain). Soils and human influences are treated later. The main hapters deal with plant landscapes in the tropics. The author of this section bases the ccount on widespread travels as a geologist in the tropics. *Subject Headings:* **1. Tropical limates 2. Tropical landscapes.**—*M.R.*

10.6–23 551.515.2:551.553.8(73)

†Douglas, Marjory Stoneman, **Hurricane.** N. Y., Rinehart, **1958.** 393 p. photos, ibliog. p. 364–372. **DWB, DLC**—This popular account of hurricanes and their devastation long the coasts of the U. S. from Miami to Texas, and in the West Indies from the earliest istorical records to 1957, gives in literary style, but in chronological order, the highlights leaned from hundreds of newspaper accounts of storms and shipwrecks, scientific articles on urricanes from REDFIELD and ESKY to RIEHL and SIMPSON; books on hurricanes by REID, LINE, TANNEHILL and others; and personal conversations with the research and operational ersonnel of the Hurricane Research Project at West Palm Beach, the Hurricane Warning ervice at Miami and Washington, and at other U. S. W. B. centers, and with natives and eamen along the many coastal beaches, the outer banks and fishing villages which have been recked by hurricanes or ruined by tidal waves in the past generations. The etymology, egends and chronicles since 1464, scientific causes and prediction, theories and reconnaissance re not neglected, nor are literary quotations, from Shakespeare, Franklin and many others, cking. *Subject Headings:* **1. Hurricanes 2. United States.**—*M.R.*

10.6–24 551.5(03)

†Forrester, Frank H., **1001 questions answered about the weather.** Illus. with photographs nd drawings by James Macdonald. Foreword by Ernest J. Christie. N. Y., Dodd, Mead, 957. 419 p. bibliog. p. 394–402 (more than 80 titles). **DLC**—A popular book giving an-vers to >1200 questions on everyday aspects of the weather. The book is arranged by ategories such as sunspots, winds, lightning, thunderstorms, tornadoes, hurricanes, floods, roughts, climatic changes, hail, mirages, rainbows, auroras, forecasting, medical meteorology, eather lore, etc. A good bibliography and a detailed index add to the value of the book for ference to almost any subject of meteorology, and the photographic illustrations and line awings enliven and break up what would otherwise be a monotonous dictionary of facts or ossary. There is an especially good list of annotated (over 100) terms used for special winds all parts of the world. *Subject Headings:* **1. Popular meteorology 2. Glossaries.**—*M.R.*

10.6–25 551.24:551.583:551.324.6

†Hapgood, Charles H. and Campbell, James H., **Earth's shifting crust: a key to some bas problems of earth science.** Foreword by Albert Einstein. N. Y., Pantheon Books, 195 438 p. 15 figs., 3 tables, 465 refs. Price: *6.50. **DLC** (QE511.H415). Also: Hapgoo Charles H., **The earth's shifting crust.** *Saturday Evening Post*, Philadelphia, 231(28):22–2 66–69, Jan. 10, **1959.** figs., port., 7 refs. **DLC**—The theory that the earth's poles shi rather suddenly when centrifugal forces originating in eccentrically located ice masses becom sufficient to cause crustal displacements, is developed extensively in this popular book. Aft a general introduction there is a discussion of past theories, including WEGENER's theories an evidence of the Ice Ages and climatic changes, theories of mountain building, crustal chang and volcanism, evidence of ocean basin and continent formation and dynamics, the shape the earth (isostasy, Antarctic ice cap). The probability of having the North Pole in Nort America and attendant glaciation, the effect of movements on life forms—extinction of mam moths and mastodons, early glaciations, the problem of evolution, and explanation on the bas of climatic changes and, finally, CAMPBELL's mechanism of displacement are also reviewe Conclusion is that similar sudden changes will occur but even so will take thousands of year Letters from ALBERT EINSTEIN and GEORGE SARTON are appended, along with a glossary, a extensive bibliography, an author and a subject index. The article in the *Saturday Evenin Post* reviews the theory in an even more journalistic style. Schematic diagrams, illustration structure of earth and changes caused by forces mentioned. *Subject Headings:* **1. Pola displacement theories 2. Climatic change theories 3. Glacial theories 4. Crustal shif 5. Evolutionary effects of climatic changes.**—*M.R.*

10.6–26 551.576:77.03:37(07

Ludlam, F. H. and Scorer, R. S., **Cloudy study: a pictorial guide.** London, J. Murra **1957.** 80 p. 73 illus. (many in color). **DLC** (QC921.L83)—The present book is a delightf collection of cloud photographs of all types, accompanied by an explanation or descriptio of each and an introduction which briefly outlines the basic principles of cloud physics, th forms of clouds, processes of development, modification, dissipation, etc. Among the clou illustrated are rare convective types, lee and lenticular clouds, noctilucent, irridescent, mamm tornado or waterspout, condensation trails, Arctic sea smoke, eye of typhoon, wing tip trail etc. The colored photos are especially beautiful. Many of the pictures were taken by o or the other of the authors. *Subject Headings:* **1. Cloud photographs 2. Cloud physi 3. Elementary meteorology textbooks.**—*M.R.*

10.6–27 551.576:771.531:371.3

Clouds (filmstrip). Strip A: Haze convection clouds, ice clouds. Strip B: Layer cloud wave clouds, billow clouds. Filmstrip DW-F19 and Filmstrip DW-F20, respectively, produce by Diana Wyllie, Ltd., London, **1958.** 24 and 25 slides, respectively. In color. Price: sing frame size 24×18 mm, 27sh 6d per strip; double frame size 35×24 mm, 37sh 6d per stri Order from producers, 18 Pont Street, London S.W.1. Notes to accompany these Filmstrips b F. H. Ludlam and R. S. Scorer. 20 p. Review by R. E. Lacy in *Weather*, London, 13(2):7 Feb. **1958.**—The color photos represented on these two remarkable film strips are excelle pictures of (A) Haze: haze top, crepuscular rays, convective clouds: small cumulus, C towering Cu, CuNb, rainbows, a Cu Castellatus, a Cu floccus; Ice clouds: Mamma, Ci C cirrus, of a warm front, and a cold front, Ci St bands, halo, contrails: (B) Layer, wave a billow clouds; sea fog, Cu, St Cu, solitary wave clouds, lee waves, rotors, the Sierra wav billows, etc. The lecture notes which accompany the film strips give short descriptions each cloud photo and of the particular circumstances of cloud type—and a couple of pages the processes of cloud formation by LUDLAM and SCORER. The films and notes are an e tensive of the color photos in LUDLAM and SCORER's recent book (10.6–26) on cloud studi and are intended as a visual aid in teaching. *Subject Headings:* **1. Cloud film strips 2. Clo formation processes 3. Cloud photographs. I. Ludlam, F. H., II. Scorer, R. S.**—*M.R.*

10.6–28 551.582.1:551.584.5(7

Ford, Norman D., **America's 50 best cities in which to live, work, and retire.** 2d e Greenlawn, N. Y., Harian Publications, **1957.** 104 p. **DWB** (312 F7112am)—A popul

ıews stand" type of compilation of recent information on the climate, opportunities for jobs, creation and culture, of each of 50 cities in the south and west of the U. S., judged by the ıthor to be "best" in the following respects: 5 best small cities, 5 best resort, 3 most cultured, best university cities, 5 cheapest, 5 most beautiful, 5 most colorful historic cities, 4 best ties for retirement jobs, 17 best cities for large incomes, 5 for retirement living and 3 most smopolitan cities. In the introduction there is a general survey of the climate of the U. S., companied by charts of annual number of sunny days, percentage possible sunshine in winter ıd in summer, average January temperature and July temperature, and a discussion of snow, ld storms, hay fever, etc., from point of view of health. *Subject Headings:* **1. Climate of . S. cities 2. Southern U. S. 3. Western U. S.**—*M.R.*

MANUALS AND REFERENCE WORKS

See also: **Local forecast. studies** (MacDonald), 10.6–94.

10.6–29 551.584.61(73)

*†Conklin, Groff, **The weather conditioned house.** N. Y., Reinhold Pub. Corp., **1958.** 38 p. numerous figs. and photos, tables, bibliog. p. 225–228. **DWB** (M84.61 C752we)—A rge illustrated book going into environment control for houses, orientation, site selection, ermal moisture control in winter, thermal control in summer, hot climate problems, heating ıd cooling, sound control and deterioration control. A glossary of terms, an extensive bliography, a good index and many fine photographs are included. Data tables and charts e valid for many places in the U. S. Useful climatic data (summer and winter design), ıta on maximum precipitation, thunderstorm days, hot weather zones, heat gain through indows, walls and roofs, radiation and moisture data, are interspersed throughout. *Subject eadings:* **1. Architectural climatology 2. Weather conditioning of houses 3. United States.** *-M.R.*

10.6–30 551.508.762(02)

U. S. Weather Bureau, **Instruction manual for rotating beam ceilometer.** Washington, . C., Instrumental Engineering Division. Revised June **1958.** 188 p. (loose-leaf) numerous gs. (including photos), numerous charts (2 fold.). Price: $1.50 from Govt. Print. Off., ashington, D. C. **DLC** (QC923.U55), **DWB** (M08.762.U587im 1958)—Technical details of the types of rotating beam ceilometers used by the U. S. W. B. are included in this manual along ith instructions on operational theory, power requirements in cold and warm climates, cable, e, and foundation requirements; detector installation, activation, alignment, inspection, st data, and corrective maintenance procedures; projector components, theory modulation, tivation maintenance; indicator theory, installation and activation, etc. Parts are specified ıd illustrated and circuits shown on wiring diagrams. Three types of ceilometer projectors Crouse-Hinds), two types of detectors (Crouse-Hinds) and two types of indicators (U. S. W. B. sign and Crouse-Hinds) are considered. *Subject Headings:* **1. Rotating beam ceilometers Ceilometer instruction manuals 3. Crouse-Hinds ceilometer.**—*M.R.*

10.6–31 551.508.5(02e

U. S. Weather Bureau, **Instruction manual for installation, calibration, and maintenanc) F420 series wind equipment (stock catalog nos. F420, F420A, F420B, F420C).** Wash., . C., Instrumental Engineering Div., Aug. **1958.** Transmittal Memo, No. 1 (31 p., 39 figs. d photos), is a revised instruction manual for the F420 series. Other types of wind equip- ent to be supplied later for inclusion in this loose-leaf manual. **DWB** (M08.5 U587in)— anual covers a description of the wind indicators; instructions for installation of: transmitters, ring, indicators, trouble shooting, nonstandard circuits; for calibration of the wind speed d wind direction components; for maintenance of wind speed, wind direction and indicator rts, range doubling circuits; installation of gust recorders and maintenance of gust recorders. rts are illustrated by photos and circuits shown in diagrams. *Subject Headings:* **1. Wind dicator instruction manuals 2. Instrument manuals 3. F420 wind equipment.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

IGY

10.6–32 550.3:551.506.22(54

The International Geophysical Year: Indian Programme. *Journal of Scientific a Industrial Research, Sec. A*, 16(6):231–233, June **1957. DWB, DLC**—A score of governmenta semigovernmental and private institutions and universities in India are listed as cooperati in the IGY effort, as well as the meteorological and magnetic network of the Indian Meteor logical Department. The special program in meteorology, geomagnetism, aurora and airglo ionosphere, solar activity, cosmic rays, glaciology, oceanography, satellite tracking, seismolog and gravity is outlined. In meteorology, 10 stations will make upper air soundings, 4 w conduct ozone measurements, 4 radiation and thermal balance measurements, 2 radar stor tracking (long range), and 2 or 3 local storm studies with radar. Two will measure the ele trical potential gradient, 2 sferics, 12 evaporation and 8 auroral observations. *Subject Hea ings:* **1. Indian participation in IGY 2. IGY program 3. India.**—*M.R.*

10.6–33 551.506.22:551.508.822(7

Canada. Meteorological Branch, **Canadian radiosonde program during the Internation Geophysical Year.** Its *CIR* 2931, *RAD* 110, May 30, **1957.** 3 p. **DWB**—A general discu sion of IGY, the Canadian meteorological program and radiosonde network, and operation requirements for radiosonde observations during IGY. *Subject Headings:* **1. Canadian pa ticipation in IGY 2. IGY radiosonde program 3. Canada.**—*M.R.*

10.6–34 551.594.5:551.506.

Chapman, Sydney, **The IGY auroral programme.** *International Geophysical Yea 1957/1958, Comité Spécial, Bulletin d'Information*, No. 7:58–61, **1956. DWB**—The objectiv of auroral observations during the IGY are: an understanding of the nature of auroras, t solar emissions, the modes and periods of emissions from the sun, their courses to the ear and the ensuing luminous, electromagnetic and ionospheric processes near our earth and in t atmosphere. The immediate objective to increase our factual knowledge of the auro The auroral program during this IGY included the following: the synoptic picture by phot graphic methods and visual surveys, alert and special world intervals for warning informatic the photometry, spectrophotometry and spectrography, the possible transfer of equipme during the months of Arctic daylight, the radio detection of aurora, the auroral radio emissio radio absorption and scattering associated with auroras, rocket studies, atmospheric electr field, auroral sounds. The principal experiments in the ionospheric program are include *Subject Heading:* **1. IGY aurora program.**—*N.N.*

ARCTIC RESEARCH

See also: **Glacier ablation, Fröya Glacier, N.E. Greenland** (Eriksson), 10.6–75; **Ice depth-density curves, N.W. Greenland** (Langway), 10.6–77.

10.6–35 551.579.4(57

Komlev, A. M., **Selevye pavodki v Zapoliar'e.** [Flash floods in the Arctic.] *Meteo logiia i Gidrologiia*, Leningrad, No. 12:31–32, **1957.** ref. **DWB, DLC**—The meteorologic and hydrological conditions associated with the occurrence of a flash flood on May 29, 19 in the vicinity of Noril'sk situated beyond the polar circle at the northern spur of the No Siberian foothills. From the upper reaches of the small mountain stream, B. Bar'ernyi, current of dirt and stones mixed with snow suddenly burst through. The dimensions of t stream, of its flow and catchment area, the vegetation of the valley through which it flo etc. are described. Intensive snow melt begins in the Noril'sk area during the last of M By May 29 a maximum temperature of 22.7°C was attained and on May 28 5 mm of rain f The accumulated water, after breaking through the snow barrier at 2130 o'clock on May rushed down as a snow-water stream and carried along remaining snow, soil, shrubs, e The speed of the stream was about 4.0–5.0 m/sec. Other examples of similar occurrences this district are mentioned. The maximum level attained during such floods exceeded t

rdinary river level by 12–15 m. These data indicate that flash floods can occur in more orthery regions than was hitherto believed. *Subject Headings:* **1. Flash floods, Arctic . Noril'sk District, Krasnoyarsk Territory, U.S.S.R.**—*I.L.D.*

10.6–36 551.311.11:551.526(988)

Loewe, Fritz, **Remarques concernant des mesures de température et d'accumulation sur Inlandsis Groenlandais.** [Remarks on temperature and accumulation measurements on the Greenland Ice Cap.] *Annales de Géophysique*, Paris, 13(2):158–159, April/June **1957.** 7 refs., qs. **DLC**—This paper reviews several observations of temperatures and ice accumulation hat were conducted in the ice capped region of Greenland during 1911, 1930 and 1949–1954 nd compares them to the preliminary results of the British expeditions at Northice (78°4′N, 8°29′W) between 1911 and 1930. The results are correlated. There is an established elation between ice accumulation and temperature variations. Average density and the pecific heat of observed granular ice blocks show the effects of temperature at varying depths. *ubject Headings:* **1. Greenland ice temperature 2. Ice accumulation-temperature relation-hips 3. Greenland.**—*N.N.*

10.6–37 551.524.2(712):551.524.32:551.581

Longley, Richmond W. (*Met. Branch, Dept. of Transport, Toronto*), **Temperature varia-ions at Resolute, Northwest Territories.** *Royal Meteorological Society, Quarterly Journal*, 4(362):459–463, Oct. **1958.** 2 figs., 2 tables, ref. **DWB, DLC**—From a study of temperature ata at Resolute, Northwest Territories, it is shown that in the Arctic regions the time of inimum temperature occurs near the end of Feb. or in early March. This delay, relative o the corresponding time in temperate latitudes, is a result of the lack of incoming radiation uring the polar night. Because of fog off open water in late July, the maximum temperature ccurs during the second week of July. (For abstract on this title from another source, *see* .9–191, Sept. 1958, *MAB.*) *Subject Headings:* **1. Temperature variations 2. Resolute, I.W.T.**—*Author's abstract.*

10.6–38 551.5(98)

McGill Univ. Arctic Meteorology Research Group, **Programme of Arctic meteorological esearch at McGill: a progress report, April 1957.** Contract AF 19(604)-1141, Appendix 1 o Status Report, No. 11, **1957.** 9 p. 9 refs. **DWB** (919 M145a)—A summary of work one on Arctic research since July 1954 at McGill University, under K. HARE. Work has been n following categories: 1) dynamic climatology of Arctic and sub-Arctic, 2) Analysis of his-orical synoptic charts at Edmonton Forecast Office, 3) Micrometeorology of sub-Arctic errain and vegetation, 4) Glacial meteorological work at Ellesmere Island for IGY. *Subject Headings:* **1. Arctic meteorology research 2. Dynamic climatology of Arctic 3. Glacier-neteorological research 4. Ellesmere Island 5. Canadian Arctic.**—*M.R.*

10.6–39 551.507.362.1:551.510.53(98)

LaGow, E. H.; Horowitz, R. and Ainsworth, J. (*U. S. Naval Res. Lab., Wash., D. C.*), **Rocket measurements of the Arctic upper atmosphere.** *Annales de Géophysique*, Paris, 4(2):131–139, April/June **1958.** 11 figs., 9 refs. French summary p. 131. **DLC**—A review s presented of the structure of the Arctic upper atmosphere as measured by rockets in the ummers of 1953 and 1954. Tentative results are reported for two Aerobee-Hi rockets fired t Fort Churchill, Manitoba, Canada, in the winter of 1956 and the summer of 1957. A omparison of these results shows: a) At 200 km, the summer daytime atmospheric density at 9°N lat. is 2.5 times the winter daytime value; and it is 20 times the winter nighttime alue. This summer daytime value is 6.5 times the corresponding White Sands value of $.4\times10^{-7}$ gm/M³. b) Between 30 and 45 km, density measurements indicate that seasonal nd latitude variations are less than 10%, while summer pressure measurements show Arctic emperatures and pressures to be significantly higher than White Sands values. This meri-ional pressure gradient leads to an easterly geostrophic wind in general agreement with nomalous sound and high altitude balloon measurements. *Subject Headings:* **1. Rocket neasurements in Arctic 2. Aerobee observations 3. Arctic upper atmosphere 4. Fort Churchill, Canada.**—*Authors' abstract.*

ANTARCTIC RESEARCH

See also: **Antarctic oceanog. and seas** (Makerov), 10.6–12; **Shackleton's Antarctic expeds.** (Fisher, M. and J.), 10.6–57; **Geomagnetic data for Antarctic** (Slaucitajs), 10.6–83.

10.6–40 551.513(9

Krichak, O. G., **Nekotorye kharakteristiki atmosfernoĭ tsirkuliatsii nad Antarktido** [Some characteristics of atmospheric circulation over the Antarctic.] *Meteorologiia i Gidr logiia*, Leningrad, No. 4:3–4, April **1958. DWB, DLC**—A summary of results of studies o the atmospheric circulation over Antarctica carried out at Mirny during 1957. The Antarct cyclone extends its ridges in those latitudes where Antarctica extends farthest northwar Mean monthly maps show six principle regions on the periphery of the continent where ridg are most frequent and stable in the lower atmosphere. The development of pressure ridges i these districts is typical but not simultaneous. The intensification of these ridges is a mer dional process, blocking the movement of cyclones arriving from the seas around Antarctic Antarctica is surrounded by six cyclonic regions in the form of quasistationary cyclones betwee the ridges corresponding to those latitudes where the isohypse of the glacier slope extend farthest southward. Frequently the Antarctic anticyclone unites the high pressure area wit ridges of subtropical anticyclones. Hence a zonal circulation is not characteristic of th Southern Hemisphere, especially the higher latitudes. There is no wind barrier betwee Antarctica and the rest of the hemisphere. The permanent anticyclone extends as high as th 300 mb level (8 km) in the eastern Antarctic. Since no circumpolar cyclone usually exists a 5–8 km, large pressure gradients arise aloft between the cyclonic zone north of the Antarct anticyclone and the subtropical belt of high pressure. This produces jet streams. Egres of cyclones from Antarctica is predicated in those regions where a depression of the surfac of the glacier is present. The surface winds formed in the six cyclonic regions influence th position of the ice fields around the continent. In many regions strong winds reaching 5 m/sec and more are present. *Subject Headings:* **1. Atmospheric circulation 2. Mirny, An arctica.**—*I.L.D.*

10.6–41 551.524.36(9

Levert, C., **Werd de "laagste temperatuur" bij de zuidpool of bij Werchojansk gemeten** [Has the lowest temperature been measured near the South Pole or near Verkhoyansk *Hemel en Dampkring*, The Hague, 56(4):70–71, April **1958. DLC**—The lowest temperatur −69.4°C measured in 1892 at Verkhoyansk should be surpassed by a temperature of −73.6° observed on May 11, 1957 at the American station of Amundson-Scott near the Antarctic pol A paper by the scientist Wild **Mélanges physiques—chimiques,** published in the *Bulleti of the Imperial Academy of Sciences of St. Petersburg* (Vol. 12), gives details on a temperatu measured during winter 1884–1885 at Verkhoyansk where a temperature of −68°C was ob served on Jan. 3 and 15, 1885 with an ethyl alcohol thermometer. This temperature co responds with −76°C measured by a usual thermometer. The lowest temperature shou thus be −76°C (1885) and not −69.4° (1892) or −73.6° (1957). *Subject Headings:* **1. Co poles 2. Amundsen-Scott Station, Antarctica 3. Verkhoyansk, U.S.S.R.**—*A.V.*

10.6–42 551.510.535(9

*Major, G., **Hourly measurements of ionospheric characteristics, Macquarie Island, 195** *Australian National Antarctic Research Expeditions*, 1947–1949, *Interim Reports*, No. 9, Ja **1956.** p. 220–315. Mostly tables. **DLC** (QC973.M25)—Graphs and tabulation of hour ionospheric characteristics for Jan., Feb., March, August, Sept., Oct., Nov. and Dec. 19 in same form as for 1950, for Macquarie Island. *Subject Headings:* **1. Ionosphere data 2. Ma quarie Island.**—*M.R.*

10.6–43 551.506.5(9

Somov, M. M., **Raboty kompleksnoĭ antarkticheskoĭ ekspeditsii.** [Work of the Inte disciplinary Antarctic Expedition.] *Problemy Arktiki*, Leningrad, No. 1:5–12, **1957.**—T Soviet expedition reached the coast of Antarctica on Jan. 5, 1956 in the region of Deposit Ba All construction work, equipping of the laboratories, etc. was completed by May 1, 195 Various expeditions were organized for the purpose of both general geographic reconnaissan

d preparation of reliable maps. Along the coast from the Gauss Mts. to the Knox coast, act coordinates were established at eight points for aerial photography fixes, from these a pplementary network of visible terrestrial orientations with respect to the stars was set up; plane table survey of the Mirny Observatory to the scale of 1:10,000 was made and the jacent area of Davis Sea was surveyed over a 20 km² area. An area of 15,000 km² was rveyed by aerial photography; the coast from the Gauss Mts. to the Shackleton ice shelf, e adjoining glaciers along the continental ledge up to and including the Bunger oasis was otographed. A physical geographic survey of the Bunger Oasis was carried out during nuary 22–30. Reconnaissance flights without landings were made to the geomagnetic pole d to the pole of inaccessibility. A tractor-sled set out on March 3 from Mirny to the geo-agnetic pole. During this trip daily meteorological observations were made; snow measure-nts, ice thickness and seismological data were collected. Also the ice regime in Davis rait, the glacial wind, etc. were investigated. At the weather stations in the Mirny region eteorological observations were made 8 times a day and microclimatic measurements were rried out regularly. An outline of the scientific work at Mirny is presented; this included rological, meteorological and actinometric observations; geomagnetic, ionospheric, glacio-gical, gravitational, biological and medical observations and aerial photographic surveys. Pivnerskoĭ Station, temperature observations at heights to 11 m above the surface and to pths of 16 m below the ice were made at four-hour intervals; daily snow accumulation, tinometric observations and occasional observations on atmospheric electricity were made. brief account of cooperation with non-Soviet expeditions in Antarctica and of the role of iation is presented. *Subject Headings:* **1. Antarctic expeditions 2. Observational data Antarctica.**—*I.L.D.*

SOCIETIES AND INSTITUTIONS

10.6–44 551.5:061.6

Berkner, L. V. (*Pres., Associated Universities, Inc.*), **The role of the national laboratory in nerican scientific progress.** *Physics Today*, N. Y., 2(4):18–22, April **1958. DLC**—"Na-onal laboratories" have been important to scientific progress in the U. S. Their establishment tes back to the period immediately after World War II when Brookhaven National Lab-atory was founded. Other outstanding laboratories and their fields of scientific researches d endeavors are reviewed. The functions of the Associated Universities, incorporated der the charter of the New York State Board of Regents, are listed. The future tasks of ch "national laboratories" include: the systematic collection and organization of astronomical owledge, the exploration of the properties of hurricanes in the Caribbean, typhoons in the cific, tornadoes on the continent, cloud physics and satellite observatories. *Subject Head-gs:* **1. Associated Universities, Inc. 2. National laboratories 3. Meteorological research stitutes.**—*N.N.*

10.6–45 551.579:061

Kobus, G. L., **25 let deiatel'nosti Odesskogo gidrometeorologicheskogo instituta.** [25 ars of activity of the Odessa Hydrometeorological Institute.] *Meteorologiia i Gidrologiia*, ningrad, No. 12:3–5, **1957. DWB, DLC**—A hydrometeorological institute was found at harkov in 1932. After its destruction during the Second World War, it was reorganized d moved to Odessa in 1944. At the present time it contains 14 departments and 87 scientific vestigators including 4 professors, 23 instructors and 27 candidates for degrees. The de-rtment of meteorology, headed by E. A. Burman, is engaged in the meteorological and rological study of the coastal areas of Odessa, the dynamics of soil moisture and the factors termining the climate of Turkmenistan. The Dept. of Hydrology, under the direction A. N. Befani, is investigating the processes of surface and underground runoff. In the pt. of Higher Mathematics, directed by M. S. Livshits, the theory of non-self-conjugating erations has been developed. The Institute has helped to organize the scientific and educa-nal program in hydrometeorology in the Chinese People's Republic. At the present the dget of the institute amounts of 10 million rubles. *Subject Heading:* **1. Odessa Hydro-eteorological Institute.**—*I.L.D.*

10.6–46 91:06

Kolobkov, N. V., **Meteorologicheskaia komissia moskovskogo filiala Geograficheske obshchestva SSSR.** [Meteorological Commission of the Moscow branch of the Geographi Society of the U.S.S.R.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:69, March 19 **DWB, DLC**—The first organizational meeting of the Meteorological Commission of Moscow branch of the Geographical Society of the U.S.S.R. was held on Nov. 16, 1957 at M. V. Lomonosov Moscow State University. G. M. Tauber delivered a paper on the **Ch acteristics of the meteorological regime of the Antarctic.** These officers were elected: Kh. Pogosian, chairman; N. V. Kolobkov, vice-chairman and B. E. Peskov, secretary. At second session, Nov. 17, 1957, Kh. P. Pogosian spoke on the **Jet stream and its circulati** The aim of this Commission is to hear and evaluate reports on latest advances in meteorolo to be informed on meteorological work in the U.S.S.R. and abroad, to participate in the popul ization of scientific work in meteorology, etc. *Subject Heading:* **1. Geographical Society of U.S.S.R. Moscow Branch, Meteorological Commission.**—*I.L.D.*

10.6–47 551.58(4

Pashinskiĭ, Ia., **O klimatologicheskikh issledovaniiakh Instituta Geografii Pol's Akademii Nauk.** [Climatological research by the Institute of Geography, Polish Academy Sciences.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 1:155, Jan./Feb. **1958. DWI** The Institute of Geography of the Polish Academy of Science founded a laboratory of clin tology in 1954 to study the principal factors and laws related to formation of local clima relations of climate to other geographical factors and the preparation and methodology climatic charts on a large scale. Three local microclimatic stations have been established the mountains of southwest Poland, in the north lake region, and in the Silesian mining a industrial region to study: (1) radiation effects on frost, (2) water surface influences a (3) atmospheric pollution from industry (effects on radiation, etc.), respectively. Res climatology is also included in the plan for scientific research—a bioclimatic research stat at Ciechocinek will study ozone, as well as the usual bioclimatic elements. Some comp climatology (Federov) studies will also be made. *Subject Headings:* **1. Climatological resea in Poland 2. Polish Academy of Science. Institute of Geography 3. Microclimatolog research 4. Poland.**—*M.R.*

CONFERENCES AND SYMPOSIA

10.6–48 551.574.41(

Georgi, Johannes, **Tau-Kolloquium in Hamburg, 26. September 1956.** [Colloquium dew in Hamburg, Sept. 26, 1956.] *Annalen der Meteorologie*, 8(3/4):123–125, **1957. DW DLC**—The colloquium on dew was held in connection with the meeting of the Meteorolog Society held at Hamburg during 25–29 Sept. 1956. K. Hiehle discussed the proper defini of dew measurement, contradicting estimates of the amount occurring in deserts and importance of dew to plant life in deserts. J. Georgi reviewed a paper by Konrad J. Buettner on (1) the importance of the horizontally directed component of precipitation, adsorption and release of atmospheric water vapor in the upper centimeters of black earth which may be to ½–1 mm of precipitation (this process does not proceed parallel to the diu temperature period) and (2) the absorption of water vapor from the atmosphere by pl organs. Finally, K.-H. Grasnick and W. Gelbke reported on the significance and metho micro-aerological measurements in the dew problem. They described the "gradient elevat whereby a thermohydrograph continually ascends and descends along a vertical wire. *Sub Headings:* **1. Dew symposia 2. Dew measurement techniques.**—*I.L.D.*

10.6–49 551.579:0

Mikhaĭlov, A. N., **K itogam soveshchaniia po voprosam obsluzhivaniia rechnogo fl** [Results of the conference on problems of servicing river shipping.] *Meteorologiia i Gidrolog* Leningrad, No. 10:58–59, Oct. **1957. DWB, DLC.** English trans. available. **DWB (** M636re)—This report on a conference on the problems of hydrometeorological servicing river shipping held in Gorki in March 1957 contains a list of participating groups and a s mary of the various meteorological aspects of river shipping. These include the follow

nformation on wind direction and velocity for open portions of water reservoirs, precise data on water level in order to compute mean level of water reservoirs, equipment of observation points with automatic and telemetering apparatus, organization of an extensive network of automatic water level recorders in the lower courses of rivers, the more rapid publication of observations on the hydrometeorological regime of reservoirs, etc. *Subject Headings:* **1. Hydrometeorological conferences 2. River shipping 3. Water level recorders 4. Reservoirs.**—*I.L.D.*

10.6–50 551.5:629.12:061.3

Symposium on meteorology and high-level aviation. *Journal of Scientific and Industrial Research, Sec. A*, New Delhi, 17(2):85, Feb. **1958. DLC**—On Dec. 8, 1957, a symposium on meteorology and high-level aviation over India and the neighboring states was held at New Delhi, presided over by the Director-General of Indian observatories. Discussions were held on air temperature, density and other factors and their significance for jet aircraft operations, clear air turbulence, radar study of thunderstorms, jet streams and other phenomena in the upper air. A number of broad conclusions were arrived at which are of practical use in planning advance meteorological services to meet the requirements of jet airline service. *Subject Headings:* **1. Meteorological conferences 2. High altitude flying 3. Aeronautical meteorology.**—*N.N.*

10.6–51 551.586:615.8:061.3

Undt, W., **Deutsche Terapiewoche 1956 in Karlsruhe.** [German Therapy Conference, 1956, at Karlsruhe.] *Wetter und Leben*, Vienna, 9(3/5):77–78, **1957. DLC**—Brief summaries are presented of the papers on climatic therapy, meteorological pathology and balneology presented at the German Therapy Conference. These included the following: Principles of therapeutic evaluation of climatic effects (PFLEIDERER) in which the importance of autonomic effects and sultriness were noted and the overemphasis on ultraviolet and infrared radiation was deprecated; the biological effects of moderately high mountain climate, of the Adriatic Sea, of Alpine climates, etc.; clinical indices for balneotherapy, etc. *Subject Headings:* **1. Climotherapy 2. Medical climatology conferences.**—*I.L.D.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION

10.6–52 551.5:771.531:378(02)

†Craig, Gerald S. and Hill, Katherine E., **Adventuring in science (Teacher's manual).** Boston, Ginn, **1955.** 167 p. figs., photos, bibliog. at end of each ch. (*Science Today and Tomorrow Series*). **DWB** (500 C886t)—The 12 chapters of this teachers guide for elementary school science instruction include three dealing with weather and atmospheric phenomena. Ch. II covers thermometers and thermal processes. Ch. III covers weather instruments, observations, forecasting, clouds, processes of weather, etc. and Ch. IX deals with the effects of wind and water on the earth. Other chapters cover astronomy, electricity, chemistry, botany, zoology, etc. The chapters are supplemented by lists of questions, hints for the teacher, lists of references to popular science books and educational films on each subject (and where to obtain equipment and films). Considerable space is devoted to the general philosophy and methodology of science education. *Subject Headings:* **1. General science teachers manuals 2. Elementary meteorology manuals 3. Meteorological films.**—*M.R.*

10:6–53 551.5:63:378

Shipchinskiĭ, A. V., **K voprosu o programmakh po meteorologii v sel'skokhoziaĭstvennykh institutakh.** [Problem of meteorological programs in agricultural institutions.] *Meteorologiia i Gidrologiia*, 9:51–52, **1957. DWB, DLC**—A discussion of the meteorology program proposed by the Timiriazev Academy of Agriculture before the conference of agricultural colleges. The usual course **Meteorology and Climatology** is replaced by a course on agricultural meteorology which is defined as the study of the physical characteristics of the environment with which plants interact in their growth and development. This approach is regarded as too

general but acts in a unifying capacity (i.e., such as would be obtained by basing the course the balance principle with a transition from the simplest balance of radiational energy to t more complex heat and moisture balance to atmospheric circulation processes). The propos program overemphasizes secondary problems such as the direction of rain during sowing, e Weather is not studied in itself but in connection with forecasting, etc. *Subject Headi* **1. Teaching of agrometeorology.**—*I.L.D.*

10.6–54 551.5:3

Skliarov, V. M., **Podbor i podgotovka nauchnykh kadrov-na uroven' sovremenny zadach.** [Selection and preparation of scientific personnel for the level of current task *Meteorologiia i Gidrologiia*, No. 1:3–7, Jan. **1957. DWB, DLC**—Among the principal cau of insufficient progress in Soviet hydrometeorology is the failure to select, place and prepa scientific personnel. Scientific personnel should be chosen not merely on the basis of co pletion of required work but also upon evidence of their ability to do creative original wo During training too much attention is given to examinations, lectures and seminars and sufficient time is devoted to independent experimental work and critical analyses of scient literature. The defense of the thesis has become a formality. New regulations for candida for the research institute of the hydrometeorological service require adequate preparation the specialty, no less than two years of practical work and evidence of scientific creativi All candidates must take examinations and present a written review or list of publicatio The preparation for the doctorate is discussed. Individual scientific workers are cited name as examples of individuals who have not fulfilled their scientific promise. *Subj Heading:* **1. Training in meteorology.**—*I.L.D.*

HISTORY

See also: **Biog. of Fr. M. A. David** (Seydl), 10.6–58.

10.6–55 551.501.9:523.7(09)(7

Adams, W. S. (*Mt. Wilson Ob., Pasadena, Calif.*), **Early solar research at Mount Wils** (In: Beer, Arthur (*ed.*), **Vistas in astronomy.** London, Pergamon Press, **1955.** Vol. 1:61 623.) **DLC** (QB3.B35)—GEORGE E. HALE visited Mt. Wilson (5700 ft) several times in 19 returned to Yerkes Observatory and secured a grant from Carnegie Inst. of Washington placing a large solar telescope on Mt. Wilson. The observatory was started with 3 memb of the Yerkes staff. Construction was completed in 1904–5. The 30″ Snow telescope a auxiliary equipment to reduce distortion produced by surface thermal conditions; ea spectrographs and spectro heliographs, studies of sunspots, photographs of sunspot spectr the results of these and later investigations; the 60″ reflecting telescope and discovery magnetic fields on sunspots are recounted in this historical article. *Subject Headings:* **1. Hist of Mt. Wilson Observatory, Calif. 2. Solar research 3. Mt. Wilson Observatory, Calif** *M.R.*

10.6–56 551.5:725.94(093

Karapiperis, Photios P., **Due monumenti attestanti l'interesse dell' antica Grecia a osservazioni meteorologiche.** [Two monuments showing the interest of ancient Greece meteorological observations.] *Geofisica e Meteorologia*, Genoa, 5(5/6):65–66, Sept./O **1957.** 3 figs. **DWB**—The author describes the origin and characteristics of two monume which indicate the usefulness of weather observations in ancient Greece. These are t "parapegma" and the "Tower of the Winds." The "parapegma" consisted of a block wood or marble upon which the year and day and the weather forecast were inscribed. T "Tower of the Winds," erected more than 2000 years ago and still standing in Athens, described. A sketch of the bas-reliefs at the base of the tower is presented, illustrating t winds, and photographs of the tower and of a "parapegma" are presented. *Subject Headin* **1. Historic weather monuments 2. Greece.**—*I.L.D.*

BIOGRAPHY

10.6–57 551.5:92 91.04(99)

†Fisher, Margery and Fisher, James, **Shackleton.** Drawings by W. E. How. London, ames Barrie Books Ltd., **1957.** 559 p. figs., photos, ports., bibliog. p. 543–546. Refs. y ch. p. 526–542. **Scientific results of the Shackleton Antarctic Expedition,** by J. M. Wordie nd B. B. Roberts, reprinted from *Polar Record*, 4(26):72–76, **1943.** p. 512–517. American d. issued by Houghton Mifflin, Boston, **1958** with title **Shackleton and the Antarctic. DWB** 919.9 G535sh), **DLC** (G875.S5F5)—ERNEST HENRY SHACKLETON was born in County Kildare, reland, on Feb. 15, 1874, made two Antarctic expeditions and attempted a third on which e died (Jan. 5, 1922 in his ship's cabin at South Georgia), before reaching the Continent. his book describes in detail the expeditions, SHACKLETON's life (with a chronology) and lustrates many phases of the expedition with excellent photographs. *Subject Headings:* **. Antarctic expeditions 2. Shackleton Antarctic expeditions 3. Biography of E. H. Shackle- on 4. Shackleton, Ernest Henry.**—*M.R.*

10.6–58 551.5:92

Seydl, Otto, **P. Martin Alois David: k dvoustému výročí jeho narozenin (1757–1957).** Father M. A. David: 200th anniversary of his birth.] *Meteorologické Zprávy*, Prague, 0(6):137–139, **1957.** photo. Russian and English summaries p. 137. **DWB**—M. A. DAVID as the third director of Prague Astronomical Observatory. From 1789 to 1833 he continued he meteorological measurements started by his predecessors. His contributions to meteor- logy and geodetic astronomy (which he introduced in Bohemia) are discussed in detail. *ubject Headings:* **1. Biography of M. A. David 2. David, Martin Alois.**—*G.T.*

10.6–59 550.38:92

Scott, W. E., **John Adam Fleming, 1877–1956.** *Journal of Geophysical Research*, Wash.,). C., 61(4):589–592, Dec. **1956.** port. **DLC**—In 1899 JOHN ADAM FLEMING began a long, istinguished career in terrestrial magnetism research. In 1907 he determined magnetic lements in Central America. He advanced steadily in the Department of Terrestrial Mag- etism of the Carnegie Institution of Washington and served as Director from 1935 to 1946 hen he retired. Ocean magnetic surveys were initiated in 1905 in the Pacific Ocean. The onmagnetic ship Carnegie made many surveys from 1909 to 1929. Many magnetic stations ere occupied and expeditions assisted. Cosmic ray research and tests in atomic energy were arried on. FLEMING published over 130 articles and received numerous awards. *Subject leadings:* **1. Obituary of J. A. Fleming 2. Fleming, John Adam 3. Geomagnetic research.** –*S. Fritz.*

10.6–60 551.5:92

Rajkay, O., **Hille Alfréd nyugalomba vonult.** [Retirement of Alfred Hille.] *Időjárás*, udapest, 61(6):460–461, Nov./Dec. **1957. DLC**—ALFRED HILLE, retiring after 35 yrs of ervice, organized the aviation meteorological service in Hungary. Since 1949 he had been n charge of the Hungarian Meteorological Institute's forecasting service (including the short ange and long range forecasting, aviation meteorology, and storm warning services). He ublished several books on aviation meteorology. *Subject Headings:* **1. Biography of Alfréd Iille 2. Hille, Alfréd 3. Aeronautical meteorology.**—*G.T.*

10.6–61 551.5:92

Shul'gin, A. M., **70-letie Pavla Ivanovicha Koloskova.** [70th birthday of Pavel Ivanovich Koloskov.] *Meteorologiia i Gidrologiia*, Leningrad, No. 12:54–55, Dec. **1957. DWB, DLC.** lso his: **Semidesiatiletie P. I. Koloskova.** [70th birthday of P. I. Koloskov.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 6:177, June **1957. DWB**—The academic and scientific areer of PAVEL IVANOVICH KOLOSKOV is summarized. Since 1934 he has worked in the nstitute of Geography and the Institute of Frost Studies of the Academy of Sciences of the .S.S.R. and in the Scientific Research Institute of Aeroclimatology of the Hydrometeorological ervice. He has contributed numerous studies in the fields of climatology, agricultural eteorology, soil science, frost research and physical geography. *Subject Headings:* **1. Bi- graphy of P. I. Koloskov 2. Koloskov, Pavel Ivanovich.**—*I.L.D.*

BIBLIOGRAPHY AND TERMINOLOGY

10.6–62 627:551.57

†U. S. National Bureau of Standards, **Hydraulic research in the United States, 1957.** *Miscellaneous Publication*, 221, July 24, **1957.** 220 p. Price from U. S. Govt. Print. O Wash., D. C., $1.50. Also **1958,** *Ibid.*, No. 224, Aug. 15, **1958.** 168 p. **DWB** (532 U5 **DLC** (TC158.U5)—A continuation of the series of annual reports beginning with the one 1951 (*see* 6B–173, Feb. 1955, *MAB*), giving a systematic compilation and index of resea projects conducted by U. S. and Canadian hydraulic and hydrologic laboratories (industr university and Government). About 3,000 such projects have been listed in the 1951–1 volumes. Over 100 contributing institutions are listed in each volume. Chief person nature of project, results, status of project and publications are listed for each project. A of the subjects of interest to hydrometeorologists or engineering meteorologists are: evap tion, diffusion, flood routing, instrumental development, snow surveys, rainfall, mesomet ology, forest influences, runoff, soil moisture, wave action and wind effects. *Subject Headi* **1. Hydraulic research projects 2. Hydrometeorological bibliographies 3. United Sta I. Middleton, Helen K.** (*ed.*).—*M.R.*

10.6–63 551.57:001 551.57

Brooks, Charles F. (*Blue Hill Met. Obs., Harvard Univ., Mass.*), **The new internatio definitions of hydrometeors.** (In: Conference on the Physics of Cloud and Precipita Particles, Sept. 1955, **Proceedings.** pub. N. Y., Pergamon Press, **1957.** p. 415–420. 1 **DLC** (QC921.5.U5), **DWB**—The 18 hydrometeors defined for the new International Cl Atlas are: snow, snow pellets, snow grains, rain, drizzle, ice pellets, hail, ice crystals, (including ice fog), mist, dew, hoarfrost, rime, glaze, spray, spouts and drifting or blow snow. Terms abandoned are: granular snow, granular ice, sleet, snow and rain mixed, grau soft hail and small hail. A lively discussion by James W. Ford, Horace Byers, C Hosler, Helmut Weickmann, V. J. Schaefer and others is included. *Subject Headi* **1. Hydrometeor definitions 2. International Cloud Atlas.**—*M.R.*

10.6–64 551.58:0

Lydolph, Paul E. (*Los Angeles State College*), **How many climatologies are there?** *fessional Geographer*, Wash., D. C., 9(6):5–7, Nov. **1957.** ref. **DLC**—A critical commen Arnold Court's paper **Climatology: complex, dynamic and synoptic,** 47:125–135, **1957**; 7.9–222, Sept. 1956, *MAB*. Attention is called to the fact that "complex climatology" is a category parallel to dynamic and synoptic climatology but is a term applied by So climatologists to describe graphically day to day weather according to specific types develo by Fedorov. Again the terms dynamic and synoptic can be replaced by simpler and n appropriate designations of "inductive climatology" and "deductive climatology." *Sub Headings:* **1. Climatology 2. Definitions of climatology.**—*I.L.D.*

10.6–65 551.58:0

Roldan Seminario, Ernesto, **Definición y concepto del clima.** [Definition and concep climate.] *Revista Meteorológica del Peru*, Lima, 3(6):7–10, **1957.** 13 refs. **DWB**— author discusses the different meanings the word "climate" can assume according to the di ent aspects (astronomical, mathematical, geographical, etc.), scales (micro-, macro-, m climate) and applications (biological, botanical, indoor, clothing climates, etc.). *Sub Headings:* **1. Climate 2. Definitions of climate.**—*G.T.*

10.6–66 551.509.5:0

Sherrod, John (*Lib. of Congress*) and Neuberger, Hans (*Penn. State Univ.*), **Understan forecast terms: results of a survey.** *American Meteorological Society, Bulletin*, 39(1):34 Jan. **1958.** fig., table, ref. **DWB, DLC**—Results of a survey of several thousand mete logical students at Penn State University during 1950–1952 are analyzed to show the lac understanding of forecast terminology among the students at that institution. The quest naire is reproduced. The only terms which were generally agreed on were fair, cloudy, wi rain, snow, warmer and colder. Cooling power of wind, and fog biased choice of terms tow

cooler. Results suggest that forecasts for the public should be in simple terms—more complex erms are not understood. *Subject Heading:* **1. Forecast terminology.**—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

OCEANOGRAPHY AND MARINE METEOROLOGY

See also: **Oceanog. chemistry of N.W. Pacific and Kurile-Kamchatka area,** 10.6–2; **Weather and oceanog. for mariners** (Krauss, Stein), 6.10–10; **Antarctic oceanog.** (Makerov), 10.6–12; **Ice thickness and distrib., Baltic Sea** (Kryndin), 10.6–78; **Sea ice eff. on water level and wind tides, Bay of Bothnia** (Lisitzin), 10.6–79; **Lightship data, N. Sea Coast, Netherlands,** 10.6–129; **Storm surges, L. I., N. Y.** (Kussman), 10.6–154; **Storm floods and tides, Poland** (Majewski), 10.6–194; **Extratropical cyclones, Boston** (Tancreto), 10.6–214; **Wind-wave relationships** (Charnock), 10.6–235; **Precip. at sea** (Spinnangr), 10.6–262.

10.6–67 532.59:551.46

Cartwright, D. E. (*Natl. Inst. of Oceanog., Wormley, Surrey, Eng.*), **On estimating the nean energy of sea waves from the highest waves in a record.** *Royal Society of London, Proceedings, Ser. A*, 247(1248):22–43, Sept. 9, **1958.** 7 figs., 2 tables, 10 refs. **DLC, DWB**—An analysis is made of the probability distribution of the largest values attained by a stationary random variable $f(t)$ over a period of time containing several oscillations. Exact computations are made and asymptotic formulae are derived for the expectation and standard error of the first, second and third greatest maxima in terms of $\sqrt{m_0}$, the r.m.s. deviation of $f(t)$ about its mean value, on the assumption that successive waves are uncorrelated; an analysis is also made of the corrections necessary to allow for mutual correlation when $f(t)$ has a narrow spectrum. The results are applied to measurements from a 24 h record of ocean waves containing some 10,000 oscillations. *Subject Heading:* **1. Ocean wave energy.**—*Author's abstract.*

10.6–68 551.46.018(261)

Chew, Frank, **An interpretation of the transverse component of the Geomagnetic Electrokinetograph readings in the Florida Straits off Miami.** *American Geophysical Union, Transactions*, 39(5):875–884, Oct. **1958.** 6 figs., 6 tables, 15 refs., 15 eqs. **DWB, DLC**—The transverse component of the Florida Current was studied by the Geomagnetic Electrokinetograph (GEK), the use of which is reviewed for the Florida Current. Based on 422 GEK fixes taken over a five-year period, including three special time series, two constituent surface transverse components are shown to exist, both of which involve a return flow at greater depths. One constituent resembles the downstream advection of an internal wave and its current reversing sign every 8 to 16 hrs. The other is a diverging surface flow in the free stream apparently explainable in terms of the vorticity equation. *Subject Headings:* **1. Florida Current 2. Geomagnetic electrokinetographs 3. Transverse component of the Florida Current 4. North Atlantic.**—*Author's abstract.*

10.6–69 551.465.018.3

Cagniard, L., **Sur la théorie de la mesure électromagnétique des courants marins.** [Theory of electromagnetic measurements of ocean currents.] *Annales de Géophysique*, Paris, 13(2):155–157, April/June **1957.** 3 refs., 7 eqs. **DLC**—A new technique has been developed by the French Laboratory of Applied Geophysics (Paris) for measurement of the speed of ocean currents and for measurement underneath the surface of oceans by an apparatus equipped to record simultaneously all kinds of physical parameters (temperature, pressure, electric conductivity, local speeds of condensed waves). This article explains the basic theory in relation to the light from the sun and its effects on the waters of the oceans at various points. In order to account for the problem presented by the edgewise effects of the earth, the author has given the analytical solutions to this and other problems encountered by the use of this theory. *Subject Heading:* **1. Ocean current measurement.**—*N.N.*

10.6–70 532.59:551.46.018:621

Ishiguro, Shizuwo, **An electronic method for recording and analysing ocean waves, Pt. An electronic system for recording and analysing sea waves.** *Oceanographical Magazi* 9(2):159–207, Dec. **1957.** 59 figs. (incl. photos), 4 tables, 11 refs., 56 eqs. **DWB, DLC** Research problems in Japan have necessitated further improvements in instrumental techniq used for recording and analyzing ocean and sea waves. Some results obtained from su research are described. The basic principles of the wave height recorders, the wave press recorders and the waveform analyzers are described. The derived formulas for each instrum application are solved. *Subject Heading:* **1. Ocean wave recorders.**—*N.N.*

10.6–71 551.46.018:535.34

Jerlov, N. G. (*Oceanog. Inst., Gothenburg*), **A transparency-meter for ocean water.** *Tell* Stockholm, 9(2):229–233, May **1957.** 4 figs., 13 refs., eqs. **DLC**—The significance of geometry of the optical system in extinction measurements for a liquid dispersion is emphasiz In particular, the mechanism by which light is lost by scattering in a transparency meter in sea is discussed. The strongly selective absorption of yellow substance is demonstrat A new transparency meter sufficiently accurate for measurements in clear ocean water described. A long optical path in the meter is attained by multiple reflection between th concave mirrors of equal curvature. The depth is recorded by means of a new device. *Subj Headings:* **1. Transparency meters 2. Light extinction in sea 3. Light scattering in sea** *Author's abstract.*

10.6–72 551.515:551.46

Kajiura, Kinjiro, **Response of a boundless two-layer ocean to atmospheric disturbanc** Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorolo Contract Cwb-9281, Technical Report (unnumbered), May **1958.** 138 p. 19 figs., tal 17 refs., numerous eqs. Thesis (Ph.D.)—Texas A. and M. **DWB** (551.46 T355tec)—T one-dimensional model of atmosphere-ocean relationship is extended to the two-dimensio case with Coriolis force acting thereon. Wave equations for the barotropic and barocli modes are set up and the formal solution and its transformation presented. Characteristics Green's Function are discussed for an instantaneous point source, a sustained point sour and a moving point source of two types. Effects of scale on the barotropic and barocli modes are then treated and a model of the atmospheric disturbance set up. The for response and transient response of water level for stationary and moving storms are cove and water level variations due to rotational wind stress and effects of convergence deduc Models are presented graphically as well as mathematically. *Subject Headings:* **1. Sto surge models 2. Wind stress on sea surface. I. Texas. Agricultural and Mechani College. Dept. of Oceanography and Meteorology II. Contract Cwb-9281.**—*M.R.*

10.6–73 534.612:551.4

Snodgrass, Frank E.; Munk, W. and Tucker, M. J. (*all, Scripps Inst. of Oceanog., Jolla, Calif.*), **Offshore recording of low-frequency ocean waves.** *American Geophys Union, Transactions,* 39(1):114–120, Feb. **1958.** 5 figs., 2 tables, 7 refs. **DWB, DLC** Vibrotron transducer on the sea bottom converts pressure into frequency of a stretched wi The oscillations are counted and recorded on shipboard in a form suitable for subsequ filtering and spectrum analysis by high speed digital computers. Oscillation by 1 mm water pressure in the frequency range 0.2 to 100 cycles/kilosec (periods 5000 to 10 sec) h been recorded at depths exceeding 100 m. *Subject Headings:* **1. Low frequency wave spec 2. Vibrotron transducers 3. Ocean wave recorders 4. Edge waves.**—*Authors' abstract.*

10.6–74 534.612:551.4

Snodgrass, Frank E. (*Scripps Inst. of Oceanog., La Jolla, Calif.*), **Shore-based recorde low-frequency ocean waves.** *American Geophysical Union, Transactions,* 39(1):109–1 Feb. **1958.** 5 figs., 3 refs., 12 eqs. **DWB, DLC**—A pressure head on the sea bottom conta a hydraulic filter which attenuates high frequency signals caused by ordinary gravity wav and low frequency signals caused by tides. Maximum response is for frequencies at about cycle per 1000 sec. A strain-gage transducer converts the filtered pressure fluctuations i

lectrical signals, which are transmitted to shore through a cable. *Subject Headings:* **1. Low requency wave spectra 2. Edge waves 3. Ocean wave recorders.**—*Author's abstract.*

GLACIER ICE AND SEA ICE

10.6–75 551.573:551.311.12(988)

*Eriksson, Backa E., **Meteorological records and the ablation on the Fröya Glacier in elation to radiation and meteorological conditions.** (In: **Festkrift tillagnad Vilhelm Bjerknes, en 14 Mars 1942.** Stockholm, Centraltryckeriet, **1942.** p. 23–50. 2 figs., 27 tables, 12 efs., 18 eqs.) (At head of T-p: Studies in North-East Greenland [Pt. 4].) **DWB**—A horough analysis of results of an expedition to northeast Greenland in 1939 to study the heat xchange between a glacier and the atmosphere, using 2 stations, one at the lower edge and ne on the firn at which temp., humidity, wind (on a mast with 3 recording anemometers), adiation (Robitzsch actinograph and standard Ångström actinometer) were measured. The base station was at 5 m at Leirevåg, and operated from Aug. 1–18 and the upper station vas at Fröya Glacier at 453 m and operated from Aug. 1–13, 1939. At the glacier station 3.4% of the heat of ablation came from radiation. Melting and evaporation are also calulated for each ablation period. In clear weather radiation balance is negative—the only ource of heat is convection. In cloudy weather convection supplies 60% of energy. Ablation vas 0.04 cm/hr in clear and 0.07 cm/hr in cloudy weather at the glacier station. Ablation t Leirevåg is also calculated and tabulated. Here the convection accounts for 26%, radiation 4% and condensation 10% of the total 0.09 cm/hour in clear weather, and 43%, 37% and 0% of 0.07 cm/hour in cloudy weather. Comparison with other expeditions shows that onditions at Leirevåg resemble those at Isachsen's Plateau, and those on the Fröya Glacier esemble those at Vatnajökull. Details are given for all of these places and for Sveanor. Local conditions make a great difference in ablation at end of ablation season. Equipment nd records are described, data presented in tables and analyzed graphically and comparatively or hourly and daily variations at the 2 sites and different heights (8 cm and 145 cm) above the lacier. Hourly cloud and sunshine are also given and the ablation terms calculated and iscussed analytically. *Subject Headings:* **1. Glacier ablation 2. Meteorological observations n Fröya Glacier 3. Fröya Glacier, N.E. Greenland.**—*M.R.*

10.6–76 551.311.17(988)

Landauer, J. K., **Some preliminary observations on the plasticity of Greenland glaciers.** *U. S. Snow Ice and Permafrost Research Establishment, Research Report 33,* July **1957.** 6 p. figs., 3 tables, 5 refs., 12 eqs. **DWB**—Preliminary evaluation of flow and shear in glacier ice s given based on deformation measurements made at two tunnel sites in the Thule area of N.W. Greenland. Measurements included the horizontal deformation of a vertical series of egs placed in one tunnel wall, deformation of core holes at the other site, and tunnel closure t both sites. The analysis assumes Nye-type laminar flow. The agreement obtained in alculated results has limited reliability due to uncertainty in the experimental data. *Subject Headings:* **1. Glacier ice 2. Greenland ice pack 3. Greenland. I. U. S. Army Snow Ice and Permafrost Research Establishment.**—*Author's abstract.*

10.6–77 551.311.12(988)

Langway, Chester C., Jr. (*U. S. Snow, Ice and Permafrost Res. Estab.*), **A 400 meter deep ce core in Greenland: preliminary report on p. 217 and p. 216 (fig.).** *Journal of Glaciology,* ondon, 3(23):217, March **1958.** fig. **DWB, DLC**—During the summers of 1956 and 1957 IPRE (U.S. Army Corps of Engineers) established a drill site in N.W. Greenland 200 mi east f Thule at 7000 ft (2134 m) where mean annual accumulation of about 40 cm (of water) ccurs, and the snow is dry (mean temperature of snow −25°C). Profiles to 400 m depth ould be made for the first time—in 1956 to 300 m and in 1957 to 411 m. The pieces of core re 10 cm in diameter and are cut into various lengths for study and for density determination. Half of the core (cut lengthwise) is in storage with the 1956 core in a snow covered trench t the drilling site to insure against loss of the other half, which was flown in dry ice to Wilnette. Detailed studies are now being made of all properties of the core. The temperature t 400 m was −25.42°C. *Subject Headings:* **1. Glacier ice 2. Ice depth—density curves . Greenland ice thickness 4. Northwest Greenland.**—*M.R.*

10.6–78 551.311.1(261

Kryndin, A. N., **O sootnoshenïi mezhdu ledovitost'iu i tolshchinoĭ l'da v Baltiĭskom mo** [Relation between extent and thickness of ice in the Baltic Sea.] *Meteorologiia i Gidrologi* No. 2:19–23, Feb. **1957.** fig., 2 tables, 3 refs. **DWB, DLC**—The author analyzes the relatio ship between the extent of the ice in a sea and the thickness of the ice with special refere to the Baltic Sea. The study is based upon data on the maximum thickness of fixed ice various stations in the Baltic Sea (Swedish stations and the Gulf of Finland) over a peri from 1910/11–1935/36 (these data are presented in a table). The thickness of ice is subj to the same variations as the extent of ice, diminishing during mild winter with little ice a increasing during severe winters. An overall correlation (for both Swedish and Finnish s tions) of $r=0.78\pm0.05$ was established between extent of ice and ice thickness. The relatio ship between ice extent and thickness is parabolic. Graphs show that in mild winters (extent <200,000 km²) the relationship between the extent of ice and thickness is almost line *Subject Headings:* **1. Ice thickness 2. Ice distribution 3. Baltic Sea.**—*I.L.D.*

10.6–79 551.556.8:551.461.2:551.311

Lisitzin, Eugenie, **On the reducing influence of sea ice on the piling-up of water due wind stress.** *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematic* 22(7), **1957.** 12 p. 2 figs., 2 tables, 5 refs. **DWB, DLC**—The Bothnian Bay has been des nated the research area for obtaining data on sea level in the presence of ice cover. A ta of comparison is given of observations made during the years 1929 to 1942 on the relationsl between wind velocity (average) and sea level, as well as on the reducing influence of sea on the piling-up due to wind stress in this region. *Subject Headings:* **1. Sea level variatio 2. Sea ice effects on water level 3. Wind tides 4. Bay of Bothnia.**—*N.N.*

GEOMAGNETISM

10.6–80 550.38:551.594

Coulomb, J., **Sur une origine aurorale possible de certaines pulsations géomagnétiqu** [Possible auroral origin of certain magnetic pulsations.] *Annales de Géophysique*, Pa 13(2):91–102, April/June **1957.** 5 refs., numerous eqs. English summary p. 91. **DLC** There is *a priori* possibility of some pulsations to be generated during polar auroras and to propagated from polar zones towards lower latitudes. A theory, rather incomplete mat matically, of the propagation, gives correct orders of magnitude for "giant pulsations." H for the "pulsation trains" often associated with geomagnetic bays, the results are in c tradiction to observed phenomena. *Subject Headings:* **1. Magnetic pulsations 2. Auror magnetic relationships.**—*Author's abstract.*

10.6–81 550.384.3(4

Dąbrowski, Adam and Karaczun, Konstanty, **Zmiany wiekowe składowej pionowej magnetyzmu ziemskiego na terenie środkowej i północno-wschodniej Polski w okresie 192 1954.** [Secular variations of the vertical component Z of terrestrial magnetism in cent and northeastern Poland in 1928–1954.] *Warsaw. Instytut Geologiczny, Biuletyn*, N 128:27–39, **1957.** 4 tables, chart (fold. in pocket). Russian and English summaries p. 38– **DWB**—The authors, using data obtained from the absolute magnetic measurements of Kalinowski as well as those of R. Bock, F. Burmeister and F. Errulat and the regio measurements made during 1949–1954, calculated the yearly average variations of the co ponent Z for the area of central and northeastern Poland. The following subjects are discusse methods of preparing the material and estimation of the magnitude of the error of the calcula yearly average variations. The chart of isoporic lines Z is also analyzed, taking under c sideration the geological structure. The following data are given in tables: number, denomi tion and geographic coordinates of the absolute measurement points, absolute values of component Z in the epoch of the absolute and regional measurements, as well as the magnitu of the secular variations and the average yearly variations of the component Z. *Sub Headings:* **1. Geomagnetic data 2. Secular geomagnetic variations 3. Poland.**—*Auth abstract.*

10.6–82 550.385

Burdo, O. A., **O nekotorykh zakonomernostiakh magnitnykh vozmushcheniĭ v vysokikh irotakh.** [Characteristics of magnetic disturbances in high latitudes.] (In: Akademiia auk SSSR. Komissiia po Issledovaniiu Solntsa, **Fizika solnechnykh korpuskuliarnykh tokov i ikh vozdeĭstvie na verkhniuiu atmosferu zemli.** Moscow, **1957.** p. 159–166. figs., 7 refs.) **DLC** (QB531.A5)—Graphs show diurnal variations in geomagnetic field tensity at Dickson Island, during quiet and disturbed days, respectively (polar storms and orldwide storms are differentiated). Time of onset and maximum of storms in relation to omagnetic latitude is shown on graph and on polar chart. Spiral patterns of currents arising om dynamo effects in the ionosphere are believed to be the most likely cause. *Subject eadings:* **1. Magnetic disturbances in high latitude 2. Dynamo current theory 3. Spiral omagnetic disturbance patterns 4. Dickson Island, Soviet Arctic.**—*M.R.*

10.6–83 550.389(99)

*Slaucitajs, Leonidas, **El conocimiento geomagnético de la Antártida Sudamericana.** [Geoagnetic knowledge of the South American Antarctic.] *Instituto Antártico Argentino, ublicación,* No. 3, **1957.** 114 p. 35 figs. (2 fold.), 17 tables. Bibliography, p. 111–114; nglish, French, German and Italian summaries p. 11–13.—The data and the results of the omagnetic investigation carried out in the region of the Antarctic Peninsula, the adjacent ands and the Weddell Sea since the 19th century, until 1956 inclusive, are given. The tables ow the values of the magnetic elements as observed by each expedition. The elaboration investigations of the daily variation, the disturbances and the secular variation are also ven. All the details of the latest Argentine magnetic field work regarding the instruments ed are given, and the stations and the general data are described. The knowledge of the stribution of aurora australis and on the relationship between geomagnetism and ionosphere, also briefly stated, and generalities are given on the magnetic-cartographic material available r the mentioned region. *Subject Headings:* **1. Geomagnetic data for Antarctic 2. Antarctica.** *-Author's abstract.*

ASTRONAUTICS—SATELLITE OBSERVATORIES

See also: **Rocket meas. in Arctic, Ft. Churchill, Canada** (La Gow et al.), 10.6–39.

10.6–84 551.507.362.2:551.510.535

Massey, H. S. W. and Boyd, R. L. F., **Scientific observations of the artificial earth satellites d their analysis.** *Nature,* London, 181(4602):78–80, Jan. 11, **1958.** eqs. **DWB**—The unching of the Soviet earth satellites took other governments by surprise. They were unched when tracking instruments in other parts of the world were inadequate and untisfactory. A list of the British stations engaged in the tracking is given. The shortmings and the achievements of the first two satellites are included here. The potentialities radar method, the clear need for accurate orbit data, the computational procedures at the ithsonian Institution and the need to use the Faraday effect for determining ionospheric nsity are also discussed. *Subject Headings:* **1. Satellite tracking 2. Ionospheric density.** *-N.N.*

10.6–85 551.507.362.1 551.507.362.2

Massey, H. S. W., **Rockets and satellites in scientific research.** *Endeavour,* London, (66):85–89, April **1958.** 2 refs., 4 eqs. **DLC**—Usefulness of rockets in obtaining ionospheric d high atmospheric composition, temperature, density, ionization and radiation data; nitations in time aloft which are overcome by use of satellites, a history of sounding rockets, eir instrumentation and future prospects, the orbits and some of the results of the first U. S. d Soviet satellites are reviewed for general information. The results of ejection of sodium por and of NO at high altitudes (40–60 mi) are also discussed. The fluorescence from the dium vapor cloud persisted for 20 min, even at points 300 mi away from the launching site. *bject Headings:* **1. Rocket soundings 2. U. S. satellites 3. Soviet satellites 4. Satellite servations.**—*M.R.*

10.6–86 62

Öpik, E. J., **Artificial satellites.** *Irish Astronomical Journal*, Armagh, 4(7/8):201–2 Sept./Dec. **1957.** 12 tables, eqs. Reprinted as *Armagh Observatory, Leaflet*, No. 46. D (629.1388 061ar)—A report on the history of artificial satellites presented to the Du meeting of the British Association for the Advancement of Science on Sept. 11, 1957 (be launching of first satellite). Discusses the theory of interplanetary travel (successful exp mental approach on high-altitude rockets dates back to 1946), the "mouse" theory, the V guard (its description and capabilities), the visibility of satellite, tracking systems used their accuracies and predicted positions, and the meteoric dangers to space vehicles. *Sul Heading:* **1. Satellite observatories.**—*N.N.*

10.6–87 551.507.362.1:551.506.7:621.

*Alekseev, P. P. et al.: **Raketnye issledovaniia atmosfery.** [Rocket studies of the mosphere.] *Meteorologiia i Gidrologiia*, Leningrad, 8:3–13, **1957.** 6 figs. (incl. photos diagram), table, refs., 8 eqs. **DLC.** Trans. into English by M. I. Weinreich. Availa Sandia Corporation, Albuquerque, N. Mex. **DWB** (M10 A366ro)—The disposition meteorological apparatus in the cone of a meteorological rocket, the type of apparatus, electrical power, etc. are described in detail with the aid of a diagram. The launching of meteorological rocket and the communication system involved in the reception of sig from the rocket are discussed. Equations are presented showing: (1) the relationship betw the fundamental parameters of the radio-telemetric line, (2) the relationship between pres within the manometer and pressure in the free atmosphere, and (3) the relationship betw the temperature of the thermometer and the temperature of the ambient atmosphere. computation of the terms of the equations and their validity with reference to the appara employed are illustrated. A graph and table showing the distribution of pressure, tempera and density with height as obtained from rocket measurements are presented. *Subject H ings:* **1. Rocket communication systems 2. Rocket measurements.**—*I.L.D.*

10.6–88 523.51:551.507.3

Berg, Otto E. and Meredith, L. H., **Meteorite impacts to altitude of 103 kilomet** *Journal of Geophysical Research*, Wash., D. C., 61(4):751–754, Dec. **1956.** 2 figs., 5 foot-r **DLC**—Meteorite impacts were measured from a rocket fired at White Sands, N. Mex. on N 17, 1955. Meteorite impacts produced light in the detector; the light was reflected t photomultiplier and the amplified pulse telemetered to the ground. There were 114 imp on the 75 sq cm detector; of these 101 occurred above 85 km. There was one impact per sq per 57 sec. The particles did not come from a single direction; the impacts were symmetr about the peak altitude of the rockets. *Subject Headings:* **1. Meteorites 2. Rocket meas ments 3. White Sands, N. Mex.**—*S. Fritz.*

10.6–89 551.507.362.1:551.51

Blagonravov, A. A., **Issledovanie verkhnikh sloev atmosfery pri pomoshchi vysotn raket.** [Investigation of the upper atmospheric layers by means of high altitude rocke *Akademiia Nauk SSSR, Vestnik*, 27(6):25–32, June **1957.** 5 figs., 2 tables. **DLC.** Tr by E. R. Hope into English available from National Research Council, Library, Ottaw Canada, as its NRC-C2456. Trans. into English available. **DWB** (M07.362 B633s Many details of the Soviet meteorological rockets and of the cosmic ray, pressure, dens composition, radiation, and other experiments (including those with a dog that was catapu out of the rocket on descent and descended in a parachute (shown in photo), etc. are descri in this informative article. Cloud photographs are also taken from 80 km or more hei *Subject Headings:* **1. Soviet meteorological rocket 2. Rocket exploration of the upper mosphere.**—*M.R.*

10.6–90 551.507.362.1:551.51

Pressly, Eleanor C., **The Aerobee-Jr NRL-51 (Aerobee-100) firing.** *U. S. Naval Rese Lab., Upper Atmosphere Research Report*, No. 34; *NRL Report*, 5179, Aug. 27, **1958.** 1 10 figs., photo., 3 tables. **DWB** (M11 U58u No. 34)—The Aerojet-General Corporation produced a new company-sponsored rocket, the Aerobee-Jr (Aerobee-100), for sounding

gion of the upper atmosphere between 70 and 90 mi alt. The first flight firing of this vehicle as conducted by the Naval Research Laboratory in cooperation with Aerojet on Feb. 18, 1958. he flight was a success, the rocket reaching a maximum altitude of 56 mi, although an early rnout caused by propellant sloshing prevented the rocket from reaching its predicted itude of 68 mi. Pre-flight preparations demonstrated the ease of handling and servicing the vehicle. The instrumentation, which was prepared to measure the various aspects of ght performance, gave good results. *Subject Headings:* **1. Rocket flights 2. Aerobee rockets Upper atmosphere research.**—*Author's abstract.*

10.6–91 551.507.362.1:551.510.53

†Singer, S. Fred (*Dept. of Physics, Univ. of Maryland*), **Research in the upper atmosphere th high altitude sounding rockets.** (In: Beer, Arthur, (*ed.*), **Vistas in astronomy.** pub. ondon, **1955–1956.** Vol. 2:878–912. 23 figs., 3 tables, bibliog. p. 910–912.) **DLC, DWB** 20.82 B415v)—High altitude rockets have been used to investigate extra-terrestrial radia- ons and the properties of the atmosphere. This article surveys the outstanding results hieved in these studies, including: direct measurements of the solar ultraviolet and X radia- on; composition and energy spectrum of the primary cosmic rays; the incidence of micro- eteorites; the dependence on altitude up to 220 km of atmospheric pressure, density, tem- rature, and composition; the distribution of ozone with height; evidence on the intensity id origin of the day airglow; the electron and ion density distribution in the ionospheric yers up to 350 km; variation of the earth's magnetic field with altitude; evidence of the cation of ionospheric current sheets and conclusions about the conductivity of the ionosphere; gh-altitude photography and its applications. Characteristics are given of high altitude unding rockets used in the U. S.: V-2, Aerobee, Viking and Deacon. Suggestions are made r overcoming some of their inherent limitations to allow expansion of possibilities of high titude studies. Arguments are presented for the usefulness of instrumented artificial satellite ckets for astrophysical research. *Subject Headings:* **1. Upper atmosphere research 2. Rocket undings.**—*Author's abstract.*

10.6–92 551.507.362:551.508

†Ordway, F. I., III (*General Astronautics Corp., 11 W. 42nd St., N. Y. 36*), **Instrumentation artificial satellites.** *Astronautica Acta*, Vienna, 4(1):90–110, **1958.** 21 figs., 53 refs. **WB**—This investigation is mainly on the different instruments installed in rockets and in rth satellites. Some four new instrument packages have been developed, laboratory tested id approved. A description of each of these is included, plus some descriptive work on eteoric erosion experiments, cosmic ray observations, the investigation of the radiation lance of the earth, the measurement of interplanetary matter and the satellite environmental easurements of pressure, temperature, meteoric incidence and skin erosion. *Subject Head- gs:* **1. Satellite instrumentation 2. Rocket instrumentation.**—*N.N.*

AERONAUTICAL METEOROLOGY

See also: **Icing of aircraft,** 10.6–6; **Meteorology for pilots** (Johnston), 10.6–8; **Equivalent headwinds at high levels** (Graystone), 10.6–20; **High-level aviation,** 10.6–50; **Approach visibility** (Haig, Morton), 10.6–310; **Visibility of beacon lights in fog** (Olivier), 10.6–311.

10.6–93 551.509.615:629.13

Downie, Currie S. and Smith, Robert B., **Thermal techniques for dissipating fog from rcraft runways.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geo- ysics*; No. 106, Sept. **1958.** 38 p. fig., table, 11 refs. **DWB, DLC**—Several techniques r dissipating fog over aircraft runways when ambient temperatures are warmer than 25°F ilize large quantities of heat. A FIDO installation would be more reliable than other ssipation techniques, but would require a large capital investment. The use of exhaust heat om jet aircraft engines has been proposed as an alternative to FIDO, because of compara- vely minor fixed installation costs and reduced operating costs. The utilization of jet air- aft has the added advantage of maximum flexibility and an emergency capability at all

USAF bases having jet aircraft. At Thule Air Base, Greenland, a FIDO installation to cl 7500 ft by 300 ft by 200 ft vertically would represent a capital investment of perhaps $2,000,(and cost about $150 per min. of operation. Using surplus jet aircraft, the capital investm would be about $300,000, exclusive of aircraft cost, while operating costs would be somew less than for FIDO. *Subject Headings:* **1. Artificial fog dissipation 2. Airport visibility** *Authors' abstract.*

10.6–94 551.509.34:629

Macdonald, Norman J., **Local forecasting handbook for Denver.** Colorado Univ., H Altitude Observatory, Institute for Solar-Terrestrial Research, March **1958.** 50 p. 52 fi tables. Mimeo.—Topography and its effect on weather conditions in mountain passes u in flying across Colorado and to New Mexico and Wyoming, rules of thumb for forecast precipitation, with synoptic examples for different seasons, objective methods, thunderst and hail probability and size forecasting techniques, turbulence, wind, visibility, ceiling, temperature (cold wave and maximum temperature), forecasting from nomograms, cha diagrams, etc. are included. Data used in preparation of this manual were obtained fi Lowry Air Force Base, U. S. W. B. Airport Station, Buckley Naval Air Station and Un Air Lines Meteorology Department. *Subject Headings:* **1. Local forecasting studies 2. jective aviation forecasts 3. Airways forecasting 4. Denver, Colo. area.**—*M.R.*

10.6–95 551.594.22:62

Faucher, G. A. and Curtis, H. O., **Hazards of lightning discharge to aircraft.** *U. S. Force. Cambridge Research Center, Air Force Surveys in Geophysics*, No. 103, Aug. **1958.** p. 1- 5 figs., 20 refs. **DWB, DLC**—This survey contains a discussion of the thunderstorm and electrical structure; an explanation of the process and types of lightning discharge; an ass ment of the damage resulting from lightning discharge to aircraft and a description of mechanism for this discharge; and an evaluation of the hazards of refueling aircraft du periods of high electric fields plus recommendations for safe procedures. Also, the rec mendations of the Lightning and Transients Research Institute for aircraft protection aga lightning damage are summarized. *Subject Headings:* **1. Lightning discharges 2. Lightn damage to aircraft.**—*Authors' abstract.*

10.6–96 551.509.1:62

International Civil Aviation Organization, **Meteorology. Annex 3 to the Convention International Civil Aviation.** 4th ed., Jan. **1956.** 31 p. At head of t-p: Internati Standards and Recommended Practices. "Supersedes all previous editions of Annex Also: **Supplement to 4th ed.,** Nov. 1955. 5 p. **DWB**—Rules effective Jan. 1, 1956 for teorological service for international air navigation. Specifically covered are meteorolog offices and aeronautical meteorological stations, aircraft observations, meteorological watc dissemination of meteorological information, AIREP and POMAR forms of reports, cc models and instructions for recording and reporting AIREP and POMAR, etc. (For abst on 3rd ed., *see* 7.3–120, March 1956, *MAB.*) *Subject Headings:* **1. International meteoro codes 2. Aeronautical meteorology codes 3. AIREP reports 4. POMAR reports.**—*M.*

10.6–97 551.574.7:62

Mazin, I. P., **Ob obledenenii skorostnykh samoletov.** [Icing of high speed aircra *Meteorologiia i Gidrologiia*, Leningrad, No. 4:3–8, April **1957.** 3 figs., 9 refs., 8 eqs. **D DLC**—Owing to the melting on the surfaces of the wing during flight in supercooled clo the kinetic heating of planes of high velocity is not sufficient in the case of low cloud tempera to raise the temperature of the wind surface above 0°C. Hence Serafini and others calculated theoretically that even supersonic planes undergo icing if the cloud temperatu less than −30 and −40°C. These conclusions have been arrived at by neglecting evapora which may exert considerable effect during considerable heating. By means of equations nomograms, the author shows that, assuming that there is no heat conduction to the int of a body (wings of the airplane), no icing can occur on supersonic airplanes during flight though highly supercooled clouds with negative temperatures are encountered. *Su Heading:* **1. Icing of high speed aircraft.**—*I.L.D.*

10.6–98 629.13:551.551:551.509.5

Pinus, N. Z., **Atmosfernaia turbulentnost', soizmerimaia s razmerami samoletov.** [Atospheric turbulence commensurate with the size of airplanes.] *Akademiia Nauk SSSR, vestiia, Ser. Geofiz.*, No. 3:395–400, **1957.** 2 figs., 4 tables, 15 refs., 3 eqs. **DLC.** Trans. o English by B. Cynk in the English Language Edition of the *Izvestiia, Bulletin of the cademy of Sciences of the U.S.S.R., Geophys. Ser.*, No. 3:145–151, 1957, issued **1958. DLC**—he conditions for the development of atmospheric turbulence causing airplane bumpiness e examined. Criteria are established on the basis of numerous observations for evaluating rbulence and the relation between turbulence and bumpiness. The characteristics of the essure field and of thermal advection favoring turbulence commensurate with the size of planes are described. A semiempirical method of turbulence forecasting is proposed. *bject Headings:* **1. Airplane turbulence observation 2. Turbulence forecasting.**—*Transl. author's abstract.*

10.6–99 551.556.4:551.46:629.135.5

Sharp, F. Herbert, (*Convair, A Div. of General Dynamics Corp.*), **The turbine engine in lt atmosphere operation.** *Aeronautical Engineering Review*, N. Y., 17(1):47–49, 56, Jan. **58.** 8 figs. **DLC**—Seaplanes operate in a salty mist environment whenever water-borne. he turbine engines consume large amounts of air and thus ingest quantities of salt which oduce deposits on compressor blades and stator vanes and produce interference and even rrosion. Research program to avoid or minimize salt damage is discussed. *Subject Heading:* **Salt spray effects on seaplanes.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Teaching of agromet.** (Shipchinskiĭ), 10.6–53.

10.6–100 551.521:551.524:635

Bensink, J. (*Agricultural Univ., Wageningen, Netherlands*), **Morphogenetic effects of ht intensity and night temperature on the growth of lettuce (*Lactuca sativa* L.), with special ference to the process of heading.** *Akademie van Wetenschappen te Amsterdam. Proceedings the Section of Sciences, Ser. C*, 61(1):89–100, **1958.** 11 figs., 3 refs. **DLC**—Lettuce plants re grown under different light intensities and night temperatures. Artificial light of highessure mercury lamps was used exclusively during the experiments. Both light and temrature had a morphogenetic effect on leaf growth: long and narrow leaves, indicated by a gth/breadth ratio of more than 1.5 are formed under conditions of low light intensity d/or high night temperature. With regard to their morphogenetic effects, a parallel exists tween low light intensity and high night temperature and between high light intensity and night temperature. The effect of different day temperatures could not yet be investigated. ading of lettuce plants only occurs when broad leaves are formed. Two different varieties owed a quantitative difference in their morphogenetic response to light intensity, which y be assumed to be related to their different light requirements for head formation. A owth controlling influence of the older outer leaves on the younger inner leaves must exist. th partial defoliation, such an influence has been demonstrated experimentally. *Subject adings:* **1. Light intensity 2. Nocturnal temperatures 3. Lettuce.**—*A.V.*

10.6–101 551.5:63:06(47)

Kontorshchikov, A. S., **Nauchno-issledovatel'skie raboty po sel'skokhoziaĭstvennoĭ teorologii v Tsentral'nom institute prognozov za period 1936–1956 gg.** [Scientific research rk in agricultural meteorology in the Central Forecasting Institute from 1936–1956.] *oscow. Tsentral'nyĭ Institut Prognozov, Trudy*, No. 55:57–63, **1957. DLC**—The agritural meteorology section of the Central Forecasting Institute and the section of agricultural teorology of the All-Union Institute of Plant Industry are the successors of the work of the ricultural Hydrometeorological Institute of the Hydrometeorological Service of the U.S.S.R. e work of the Central Forecasting Institute is carried on in cooperation with the hydroteorological service. In 1938 the first manual, **Agricultural hydrometeorology** (A. V. DOROV), was published and in 1952 a textbook on **Agricultural meteorology** (G. Z. VENT-

SKEVICH) was issued. Also the **Handbook for making phenological observations and forecas** which was first published in 1941, has been expanded and reissued. Research is being carr out on the relationship between temperature and the developmental rate of plants; utiliza of soil moisture by plants; the mechanism of movement of water in soil; the formatio water supplies in the soil during the summer and the relation between soil moisture and weat condition of grain crops, etc.; the characteristics of soil moisture in shelter belt regions semi-arid regions under cultivation, etc; agroclimatic characteristics of the virgin soil regi the microclimates of grass stands; the relationship of the elements of radiation and w balance to the formation of conditions favoring potato growth; meteorological conditi favoring wintering of winter crops; etc. *Subject Headings:* **1. Agrometeorological resea 2. U.S.S.R.**—*I.L.D.*

10.6–102 551.5

Landsberg, Helmut E. (*Dir. Office of Climatology, U. S. W. B.*), **Looking ahead at weather.** Wash., D. C., U. S. Weather Bureau, Dec. 17, **1957.** 8 p. "Text of spe Dec. 17, 1957, Farm Equipment Institute, Chicago, Illinois." **DWB** (M:63 U5871 General remarks on the present and future accuracy of short range forecasts and recent provements (greater specialization or detail) in quantitative forecasts for agriculture, aviat industry, etc; long range forecasts; use of computers in research or computation of heat moisture balance; IGY; rain making and sundry services for agriculture provided by mac processing of climatic data (e.g. dates and probabilities of frost or snow), etc. *Subject Head* **1. Progress in meteorology 2. Agricultural meteorology.**—*M.R.*

10.6–103 551.501.9:63

Moroz, A. A. and Kutoboĭ, A. M., **[Review of] Rukovodstvo dlia agrometeorologiches postov MTS kolkhozov i sovkhozov, [published Leningrad, Gidrometeoizdat, 1955.]** [Ha book for agrometeorological stations of the Machine Tractor Stations, collective farms, state farms.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:64–65, March **1957. DWB, I** —This handbook was issued to these agricultural bodies in order to increase the numbe weather observation points, the number of which is still insufficient for the needs of agricult Various deficiencies in this handbook are pointed out. *Subject Headings:* **1. Agrometeorolog stations 2. Soviet instruction manuals 3. Observers manuals.**—*I.L.D.*

10.6–104 551.524:581.14:6

Shigolev, A. A., **Temperatura kak kolichestvennyĭ agrometeorologicheskiĭ pokaz skorosti razvitiia rasteniĭ i nekotorykh elementov ikh produktivnosti.** [Temperature quantitative agrometeorological index of the development rate of plants and some elem of their productivity.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, No. 53:75–81, 1 2 figs. **DLC**—Investigations carried out in the Central Institute of Forecasting indicate plants, with biological properties which run their course within a temperate climate with and warm seasons, have a uniform lower limit of effective temperature for development. the basis of the relationship between total effective temperature and developmental ph thermal constants for interphase development and various phenological indications have developed. In view of the fact that the duration of the period from ear formation to the p of waxy ripeness of grain crops depends upon environmental temperature, it is assumed the weight of grain is related to the duration of its formation or with the temperature o environment during the duration of this period. This relationship is expressed by: $v = \frac{K\Sigma}{t-}$ where v = weight of 1000 grains, $\Sigma t_{>5°}$ = sum of effective temperatures during the period o formation to waxy ripeness, t = mean temperature for the period, and K = coefficient chara izing the relationship of 1000 grains to length of ripening period in a given variety of w The yield of a single stalk can be computed by the equation:

$$v = \frac{K\Sigma t_{>5°} 1.7n}{(t-5°).1000}$$

where v = weight of grain in a single ear, n = mean number of spikelets in an ear and 1.7 = c cient for computing mean number of grains in an ear according to the number of spikes.

ct Headings: **1. Temperature effects on plant growth 2. Effective temperatures 3. Agro-eteorological indexes.**—*I.L.D.*

FOREST METEOROLOGY AND FIRE WEATHER

See also: **Forest micromet.** (Baumgartner), 10.6–295.

10.6–105 551.577.52:634.0.1(47)

†Kuznetsova, L. P., **Rol' rel'efa i lesov v raspredelenii kolichestva osadkov na ravnine.** The role of relief and forests in the distribution of precipitation amounts on a plain.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 72:76–91, **1957.** 4 figs., 2 tables, 32 refs. **DLC**—A quantitative evaluation of the effect of forests on precipitation in various regions of the U.S.S.R., with a review of the literature on this subject. A number of rain gages were located in forests oriented in varying directions with the wind. It is concluded that forests act as orographic barriers (e.g., as hills) in increasing precipitation, that in the warm season precipitation increases 1–3% with each 10% increase in area of forest, on the lee (eastern) side of some forests there is a seeming decrease in precipitation, and a forest acts as an influence which is secondary to relief but which cannot be ignored in cartography (drawing isohyets) and in planning irrigation or reclamation projects. *Subject Headings:* **1. Forest effects on precipitation 2. U.S.S.R.**—*M.R.*

10.6–106 551.556.1:634.0.1(741,742)

McLintock, Thomas F. (*Penobscot Res. Center, Bangor, Me.*), **Factors affecting wind damage in selectively cut stands of spruce and fir in Maine and Northern New Hampshire.** *U. S. Forest Service. Northeastern Forest Experiment Station, Upper Darby, Pa., Station Paper*, no. 70, **1954.** 16 p. 6 tables, 11 refs. **DWB** (M56.1 M165ta)—In five areas of Maine and Northern New Hampshire, a study was conducted on wind damage to spruce and fir left after selective cutting, for an average of 3½ yrs after cutting. Among many other results, it was found out that no apparent difference does exist between softwood and mixed types. More than 60% of the damage to fir was attributed to breakage and two-thirds of the spruce damage, to uprooting. Fir was three times as susceptible to wind damage as spruce. *Subject Headings:* **Wind damage to forests 2. Forest damage 3. Maine 4. New Hampshire.**—*N.N.*

10.6–107 551.5:368.10(944)

Robin, A. G. and Wilson, G. U. (*both, Central Office, Melbourne*), **The effect of meteorological conditions on major fires in the Riverina (New South Wales) District.** *Australian Meteorological Magazine*, Melbourne, No. 21:49–75, June **1958.** 5 figs., 3 tables, 7 refs. **DWB** The effects of atmospheric temperature, relative humidity, wind speed and the preceding rainfall on the incidence of major fires in the Riverina are discussed. Data is so selected that the effects of nonmeteorological factors are kept to a minimum and thus may be neglected. Results of earlier investigations in the U. S. are considered, notably the influence of the stability and wind structure in the lower troposphere on convection and fire behavior. The absence of observations of upper air temperatures prohibits the study of these factors. Conclusions are drawn regarding the relative importance of the selected surface meteorological conditions in determining whether or not a fire will develop into a major conflagration. A forecasting aid is suggested whereby it is possible, from forecasts of the above surface meteorological conditions, to assess the likelihood of major fires developing in flat country where there is ample fuel in a fully cured condition. *Subject Headings:* **1. Fire weather conditions 2. Riverina District, New South Wales, Australia.**—*Authors' abstract.*

INDUSTRIAL METEOROLOGY

See also: **Weather conditioning of houses, U. S.** (Conklin), 10.6–29; **River shipping and water level recorders** (Mikhaĭlov), 10.6–49.

10.6–108 620.91

Scarlott, Charles A. (*Stanford Res. Inst., Menlo Pk.*), **Changing energy scene.** *Scientific Monthly*, 84(5):221–228, May **1957.** 2 refs. **DWB, DLC**—The Energy Resources Conference

held in Denver, Colo., on Oct. 29, 1956, discussed the basic facts about our crude oil and natur gas reserves in the event of any restrictions from external oil companies. The U. S. h a reserve of about 35 billion barrels of crude oil which it is using at the rate of 3 billion barr annually. Possibilities that surround the future discovery and production of more natural g coal, oil shell, tar sands and fossil fuels are outlined. The U. S. has about 60 million tons uranium for the development of nuclear energy. The changing energy scene has been grea enhanced by this reserve. Much reliance must still be placed on water power, although it playing a minor part in the changing era. Reactors for space heating, industrial proces as well as transportation, are receiving much attention here and elsewhere today. Vaster Norway, with a population of 65,000, is considering an experimental reactor for central heat of the city. Vast sums of money are being spent in many parts of the world for the master of fusion reaction. *Subject Heading:* **1. Energy sources.**—*N.N.*

10.6–109 551.578.46(

Thomas, Morley K. and Boyd, Donald W., **Computed maximum snow loads.** *Natio Research Council, Wash., D. C. Div. of Building Research, Building Note*, No. 34, Feb. 19 5 p. 3 refs. **DWB** (M78.46 N277 co)—Tables give computed (not actual measured) ma mum snow loads for horizontal, unheated surfaces in lb/sq ft for 20 stations in British Columb 12 in Alberta, 6 in Saskatoon, 12 in Manitoba, 55 in Ontario, 27 in Quebec, 8 in New Brunswi 10 in Nova Scotia, 2 on Prince Edward Island, 5 in Newfoundland, 3 in the Yukon and 8 in Northwest Territory—168 in all. Maximum values are 90 at Goose Bay, Labrador and Ki Lake, Quebec. Records from 1941–1956 were used assuming a specific gravity of 0.2 for snow, and that the maximum weight of snow on a roof will be the same as the maximum sn on the ground, plus 24 hr rainfall during the months when maximum snow loads are like Values are rounded off to nearest 5 lb/sq ft. *Subject Headings:* **1. Maximum snow loads Canada 2. Canada.**—*M.R.*

10.6–110 551.506:551.571:69

*Institution of Heating and Ventilating Engineers, London, **Hygrometric data for conditioning calculations, together with supplementary data for temperatures up to 300 Being an extract from the Guide to Current Practice issued to its members by the Institut** 2d ed. London, **1954.** 82 p. tables. **DLC** (QC917.I5 1954)—Tables for 30°, 32°, 34°, 3 38°, 40°, 41° . . . 87°, 88°, 90°, 92°, 94°, 96°, 98°, 100°, 102°, 104°, 108° . . . 132°, 13 give for values of relative humidity ranging in 4% intervals for 0–28% and 72% to 100%, 2% from 28% to 72%, the corresponding vapor pressures, dew points, saturation, moistur grains, total heat in Btu, volume in cubic feet and wet bulb temperature in screen and sling. Additional tables from 140° to 300°F are given for 10°F and 10% r.h. intervals. Ot hygrometric data, definitions of units, and psychrometric charts for 60°F–300°F and 3 to 130°F and a nomogram for 30°F to 130°F allow quick calculation, interpretation or c version of any 2 or more of the parameters. *Subject Headings:* **1. Hygrometric tables 2. grometric charts 3. Air conditioning calculations.**—*M.R.*

10.6–111 551.524.36:631.563:634

Smith, W. Hugh (*Ditton Lab., Dept. of Sci. & Industrial Res., Larkfield, Maidsto* **Reduction of low-temperature injury to stored apples by modulation of environmental co tions.** *Nature*, London, 181(4604):275–276, Jan. 25, **1958.** 2 figs., 5 refs. **DWB, DL** The temperature at which apples were stored was raised from 0° to 15°C for five days a which the original storage temperature was restored. All the apples were cut in half tra versely to the stem-calyx axis at the same date 18 weeks after commencement of storage. the date of the treatment was advanced there was at first a progressive reduction in the ex and intensity of injury but that was followed by a regular increase." The amount of inj where the warming was applied was comparable to that of samples warmed at the end of experiment, five days after examination. The minimum injury occurred when warm was applied 6–8 weeks after beginning of storage. When during the treatment the apples exposed to a stream of CO_2 and air the amount of injury after 18 weeks of storage was redu greatly, "the degree of the reduction being greater when the concentration of carbon dio

uring warming was 20% than when it was 10%." *Subject Headings:* **1. Low temperature ffects on stored apples 2. Apple storage.**—*I.L.D.*

10.6–112 551.521.1:664.8.047

Ismailova, A. A., **Vozmozhnosti ispol'zovaniia solnechnoĭ energii dlia sushki fruktov i voshcheĭ.** [Possibility of utilizing solar energy for fruit and vegetable drying.] *Akademiia Nauk SSSR. Energeticheskiĭ Institut, Ispol'zovanie solnechnoĭ energii, Sbornik 1,* issued Moscow, **1957.** p. 232–247. 12 figs., 2 tables, 5 refs., 8 eqs. **DWB** (621.47 B347is)—In this tudy on the use of solar energy in fruit drying, the author examines the characteristics of ifferent types of solar driers, the optimum conditions for their operation, the principal technical roperties and parameters of drying and the characteristics and parameters of air heaters. hree types of solar driers employed by Energetics Institute of the Academy of Sciences of the .S.S.R. in Tashkent, namely: (1) sun drier with preliminary heating of air; (2) without reliminary heating of air, and (3) chamber drier, are described with the aid of photographs nd diagrams; atmospheric parameters (atmospheric moisture, temperature of dry air and ate of air movement) for each type of drier at which various types of fruit were dried are resented in a table; and graphs showing the drying of various fruits in the different types of riers are shown. The heat balance of an atmospheric heater is analyzed theoretically. A rier of the type known as "heat box," useful for obtaining air temperatures of 100°C, is escribed and formulas for calculating the coefficients of heat exchange of atmospheric solar riers are presented. For calculating heat transfer from the boiler on the side of the glass overed surface they are:

$$Nu_t = 0.42\ Re_t^{0.65} \text{ at } 210 \leq Re \leq 620$$
$$Nu_t = 11.1\ Re_t^{0.156} \text{ at } 620 \leq Re \leq 1400.$$

or calculating heat exchange from the boiler on the side of the bottom of the installation they re:

$$Nu_t = 0.023\ Re_t^{1.06} \text{ at } 170 \leq Re \leq 520$$
$$Nu_t = 1.5\ Re_t^{.423} \text{ at } 250 \leq Re \leq 1200.$$

ubject Headings: **1. Solar energy utilization 2. Solar driers 3. Fruit drying.**—*I.L.D.*

10.6–113 551.5:678

Barrett, Robert B., **Resistance of plastics to outdoor exposure (a condensation).** *U. S. iscatinny Arsenal, Dover, N. J., Technical Report,* No. 2102, Feb. **1955.** 261 p. 2 figs., umerous tables. **DWB** (668 B275re)—Extensive tables of data are presented for determining ort-term (6–7 month) and long-term (2½–3 yr) outdoor weathering characteristics of thermo-lastics, thermosets, cellulosics, laminates, elastomers, etc. and the effect of additive filters r modifiers of various types at various places (Arctic, tropic, desert, etc.). The report is ntended as a guide to selection of plastics for use in outdoor military ordnance. Of 76 materials ested, a few (3) were unaffected by weather for 3 yrs, and a large number (24) degenerated ver 50% in short periods. Climatic data (solar radiation, rainfall, temperature, relative umidity) for 4 places where tests were made (Piscatinny, Churchill, White Sands and Panama) re briefly summarized. *Subject Headings:* **1. Weathering of plastics 2. Climatic effects on lastics.**—*M.R.*

10.6–114 551.5:6

Smith, Charles Pennypacker (*Pacific Gas and Elec. Co.*), **The P. G. & E. Company is weatherwise."** *National Conference on Applied Meteorology, Hartford, Conn., Oct. 1957, roceedings,* issued **1957.** Section B:16–17. **DWB** (M A512pro). Also: Parsons, Francis J., r. (*Pacific Gas and Elec. Co.*), **Applied meteorology in a private utility.** *Ibid.,* Section B:18–21. g. **DWB** (M A512pro)—The California Gas and Electric Company's activities, some of its eather problems and tasks of its staff of four meteorologists in the fields of routine forecasting, onitoring, dangerous weather situations, consultant services, and experiments in cloud eding are summed up and explained by examples. *Subject Heading:* **1. Applied meteorology.** *G.T.*

10.6–115 551.553.6:621.311.24(54

Bhatt, U. J., **Possibility of wind power utilization in Saurashtra.** *UNESCO, Arid Zo Research*, 7:115–118, **1956.** fig. French and Spanish summaries p. 117–118. **DWB, DLC** The location, area and topography of Saurashtra, the most westerly state of India is describe A table giving the maximum and minimum monthly wind velocities at coastal and interi stations and a map showing transmission and distribution lines and area of supply of ea major electric power station are presented. The feasibility of using wind energy is discusse *Subject Headings:* **1. Wind power projects 2. Wind velocity data 3. Saurashtra, India.** *I.L.D.*

MEDICAL METEOROLOGY

See also: **Medical climat. conf.** (Undt), 10.6–51; **Climate and exercise** (Buskirk, Bass), 10.6–301.

10.6–116 551.510.7:5

Aurand, Karl (*Frankfurt a.M.*), **Über die biologische und medizinische Wirkung d Radioaktivität der Umwelt.** [Biological and medical effects of environmental radioacti ity.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, No. 13:167–176, **1958.** figs., 12 refs. **DWB**—The components of natural radioactivity are described and distinct is made between external and internal radioactivity present in all matter. The former consis essentially of hard gamma radiation, the latter of isotopes either homogeneously distributed the organism or selectively deposited in specific tissues. Radon products, which accumula in the aerosol and are retained in breathing, make up the third component. The author d cusses the various physical processes produced by cosmic radiation and the order of magnitu of external and internal radiation, and shows that in the course of a radon bath cure the effecti radiation dose is more than ten times the simultaneous natural doses but is found to be be ficial. The biological effects on tissues of natural radiation and artificial radiation are discusse The evidence on the distribution of Sr^{90} in bone tissue, as reported by studies of LIBBY, a the possible relation of leukemia to radiation dose are also considered. *Subject Headin* **1. Radiation hazards 2. Radioactive fallout effects.**—*I.L.D.*

10.6–117 551.586:6

Krammer, H. (*Austria*), **Das künstliche Klima in der Medizin.** [Artificial climate medicine.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. Human Bioclimatology), **1957.** 4 p. **DWB**—The general approaches, statistical and perimental, to the study of the effect on disease are discussed and some of the work on medi climatology carried out at Lainz is described. In connection with the geographical distributi of disease as functions of latitude and longitude, maps were constructed in which the d tributions of diseases were plotted as functions of meteorological elements in which the coor nates were temperature and humidity, or temperature and wind velocity, etc. The effect climatotherapy was investigated by determining the nature of the climate prevailing in p ticular climatic resorts favorable for recovery from a given disease and then subjecting dividuals with this illness to conditions in which the elements of the beneficial climate w varied individually. Optima of the individual weather climate and of the combinations co be determined. The problem of synthesizing climates, the medical application of synthe climates, of indications for "artificial aerotherapy," etc. are discussed in general terms. *Subj Headings:* **1. Weather effects on diseases 2. Medical climatology 3. World disease ma 4. Artificial aerotherapy.**—*I.L.D.*

10.6–118 551.586:616.23:551.582(56, 4

Küley, M. (*Turkey*), **Ueber den Zusammenhang zwischen allergischen Krankhei und bioklimatische Faktoren in der Türkei.** [Relation between allergic diseases and b climatic factors in Turkey.] *International Journal of Bioclimatology and Biometeorolo* Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), **1957.** 3 p., 5 figs., 2 tables. **DWB**—T effect of weather and its elements, temperature, moisture, wind, cloudiness, etc., upon incidence of bronchial asthma is investigated on the basis of geographic distribution of

ases of asthma in Turkey. The region around the Sea of Marmora, especially the Dar-lanelles Straits and the eastern parts of the Black Sea, are characterized by high incidence f asthma. The Mediterranean Sea, especially the eastern part, provides marked protection gainst asthma. A qualitative description of the various climatic regions of Turkey and the espective percentage of asthma incidence in each region are given. *Subject Headings:* **. Weather effects on asthma 2. Climate of Turkey 3. Turkey.**—*I.L.D.*

10.6–119 551.586:591.11:616

McDonagh, J. E. R. (*Gt. Britain*), **The influence of meteorological factors upon the hysico-chemical state of the blood.** *International Journal of Bioclimatology and Biometeor-logy*, Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), **1957.** 2 p., 12 figs. **DWB**—Over a ong period of time the author has examined daily blood samples of patients in order to deter-nine whether any relationship exists between the refractive index and viscosity of the serum nd the percentage of blood protein and meteorological factors. The values of all their indices end to fall during the summer and to rise in the winter, but unequally. The viscosity is the nost sensitive of the three tests to the factors causing the rise and fall. The refractive index s more sensitive than the percentage of blood protein to the factors causing the rise, while the ercentage of blood protein is more sensitive than the refractive index to the factors causing he fall. This fall and rise coincide with the appearance of epidemics of the respiratory type in he winter and of the nervous type (poliomyelitis) in the summer. Curves showing the annual ariations of these factors are presented. The relationship of these variations to specific ncidents of poliomyelitis and influenza epidemics are discussed. *Subject Headings:* **1. Weather ffects on blood 2. Weather effects on disease.**—*I.L.D.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Space flight** (Bates), 10.6–4; **Solar res., Mt. Wilson Obs.** (Adams), 10.6–55; **Agromet. stations** (Moroz, Kutoboĭ), 10.6–103; **Balloon ascension rates** (Sinha), 10.6–135; **Upper air wind computation techniques** (Rossi), 10.6–137; **Ionospheric wind meas. techniques** (Banerji), 10.6–236; **Atmos. elec. networks, Switzerland** (Dolezalek), 10.6–318.

10.6–120 551.501.45:551.582.2(493)

Sneyers, R., **Aspects statistiques de quelques problèmes de climatologie.** [Statistical spects of some problems in climatology.] *Belgium. Institut Royal Météorologique. Con-ributions*, No. 42, **1958.** 9 p. 7 refs. **DLC**—Statistical problems in climatology are divided nto two classes and the author illustrates his classification with some examples from Belgian limate. The existence of a heterogeneity in the series of thermometer observations at Uccle, he persistence of the daily values of air temperature, the warming of the climate and the requency of storm tides are mentioned. *Subject Headings:* **1. Statistics in climatology 2. Cli-nate of Belgium 3. Belgium.**—*A.V.*

10.6–121 551.501.5:551.552

Fea, G.; Montalto, M. and Gazzola, A., **Sulla ricerca del procedimento piú opportuno per 'applicazione del metodo di analisi grafica della velocità del vento osservato.** [Search for the nost convenient procedure for applying the method of graphical analysis to observed wind elocity.] *Rivista di Meteorologia Aeronautica*, Rome, 17(4):3–13, Oct./Dec. **1957.** 3 figs., charts. French, English and German summaries p. 3. **DWB**—Results are here reported f work carried out to find out spacing between isotachs, as well as shift along positive directions f axes, most appropriate for practical application of objective graphic analysis technique, n a synoptic scale, of tropospheric velocity fields. A 10 kn spacing and a 250 km shift meet ne requirements for an easier technique and the most reliable results, both qualitatively and uantitatively. *Subject Headings:* **1. Graphical interpolation of wind isotachs 2. Isotach nalysis.**—*Authors' abstract.*

10.6–122 551.501.5:551.55

Mertsalov, A. N., **Nomogramma dlia rascheta divergentsii i vikhria skorosti vetra** [Nomogram for calculating divergence and vorticity of wind speed.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:48–51, **1958.** 3 figs., ref., eqs. **DWB, DLC**—The author discusses the method and the nomogram presented in **Rukovodstvo po kratkostochnym prognozam pogody, chast'** 1, **1955** [Handbook for short range weather forecasting, Pt. 1, 1955] for determining the horizontal wind divergence by plotting pilot balloon data on a chart of pressure topography. According to this method, in order to determine the wind divergence it is necessary to find the value of corresponding wind components at four given points on the nomogram. The use of this procedure is illustrated and the possible errors involved are discussed. A nomogram is presented to determine wind divergence and is based upon the relationship between radial wind constituents at given points of a region (placed at a given distance from the center of the region) and the wind divergence. The nomogram takes into account the distance from points, for which the wind divergence is determined, to the pilot balloon point. The construction of the nomogram is described and its use is illustrated. *Subject Headings:* **1. Horizontal wind divergence nomograms 2. Nomogram for calculating wind divergence.**—*I.L.D.*

10.6–123 551.501.81:551.509.52:551.515

Goodman, Jerry, **Study of typhoon and storm forecasting by radar.** San Francisco Calif., 313th Air Div., U. S. Air Force, Dec. 17, **1957.** 4 p. table. **DWB** (M01.81 U581st)— During the 1957 typhoon season, the 313th Air Division successfully forecast every typhoon or tropical storm that affected the Ryukyu area, by electronic means as much as 10 days in advance. The details of the forecast method, which depends on the attenuation of radar signals of the solar-radar program (Operation SUNTAN), thought to be caused by salt particles ionized by solar UV radiation in the upper atmosphere, and carried 1000–1500 mi ahead of the storm by high level winds, are briefly outlined. The radar used was the AN/FPS-3 and After the typhoons pass, the negative attenuation values change to positive. *Subject Headings:* **1. Typhoon forecasting 2. Radar attenuation due to tropical cyclones 3. Ryukyu area.**—*M.*

10.6–124 551.501.81:551.55

Malinovski, Al., **Radiolokatsionna uredba za opredeliana posoka i skorost na visoki viatŭr.** [Radar set for determining the direction and speed of upper air winds.] *Khidrologiia i Meteorologiia*, Sofia, No. 4:46–53, **1956.** 9 figs. Russian and English summaries p. 5 **DLC**—The radar set described in this paper is located at the Aerological Dept. of the Bulgarian Weather Service. It is designed to replace the conventional pibal theodolite in conditions of low visibility. The radar triode transmitter operates in the 50 cm band. Great accuracy in elevation and azimuth (1/10 deg) is achieved through conical scanning. Range is measured directly on the Type A indicator with a circular base with an accuracy of ±100 m. More accurate reading (±20 m) is possible when using a special device "stretching" the base. The set has a peak power of 20 kw, pulse duration 2 sec, antenna beam width of 5°. *Subject Headings:* **1. Rawin techniques 2. Bulgaria.**—*Author's abstract.*

10.6–125 551.501.81:551.577:551.515

Sal'man, E. M., **Radiolokatsionnoe issledovanie struktury livneĭ i groz.** [Radar study of the structure of showers and thunderstorms.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 72:46–65, **1957.** 9 figs., 18 refs., 40 eqs. **DLC**—Radar study of the structure of showers and thunderstorms which required special methods of radar observation, radio echo intensity measurements, and the processing of a large quantity of observations made in the summers of 1954 and 1955 at the Main Geophysical Observatory. The method can be extensively used in hydrological investigations for remote measurement of precipitation intensity and of precipitation distribution. *Subject Headings:* **1. Radar analysis of rain 2. Radar analysis of thunderstorms.**—*A.M.P.*

10.6–126 523.5:551.501.

Weiss, A. A. (*Div. of Radiophysics, C.S.I.R.O., at Dept. of Physics, Univ. of Adelaide*) **The 1956 Phoenicid meteor shower.** *Australian Journal of Physics*, Melbourne, 11(1):11

117, March **1958.** fig., 3 tables, 9 refs., 3 eqs. **DLC** From radio observation of this shower at Adelaide the radiant coordinates are estimated to be 15 ± 2, -55 ± 3. The radio record was obtained when the earth was some 6 hr from the centre of the stream. The radio rate of 30/hr measured on an equipment of high sensitivity is much lower than expected from the visual rates of from 20 to 100/hr reported from 1 to 9 hr later. Echo duration and amplitude are smaller than would be expected from the visual brightness of these meteors. The low radio rate and lack of bright radio meteors could be due to observation on the fringe of the stream or to low ionizing efficiency of slow meteors. *Subject Headings:* **1. Meteor showers 2. Radio meteor observation techniques 3. Adelaide, Australia.**—*Author's abstract.*

10.6–127 551.501.81:551.594.5

Weiss, A. A. and Smith, J. W. (*both, Dept. Phys. U. of Adelaide*), **Radar record of an aurora at Adelaide.** *Journal of Atmospheric and Terrestrial Physics*, London, 12(2/3):217–218, **1958.** 2 refs. **DLC**—The aurora of Sept. 13, 1957 was visible throughout Australia and was observed from Adelaide. Facts gathered were similar to those observed by HARANG and LANDMARK in 1954. The auroral echoes were first heard from 1655 to 1927 LT and the aurora was first seen at the limiting slant range of 900 km. The echoes varied considerably during the course of the aurora. They first appeared with small amplitude at maximum range. The amplitude then increased until the range reaches a minimum value and thereafter decreased again as the range increased. *Subject Headings:* **1. Radar echoes from auroras 2. Aurora australis—Sept. 13, 1957 3. Adelaide, Australia.**—*N.N.*

OBSERVATIONAL DATA

See also: **Indian participation in IGY,** 10.6–32; **IGY radiosonde program, Canada,** 10.6–33; **IGY aurora program** (Chapman), 10.6–34; **Antarctic expeds.** (Somov), 10.6–43; **Rocket communication systems** (Alekseev), 10.6–87; **Hygrometric tables and charts,** 10.6–110.

10.6–128 551.506.1:551.582(73)

Ludlum, David M. (*Ed., Weatherwise*), **March and April, a turbulent spring season.** *Weatherwise*, Boston, 10(3):98–103, 106, June **1957.** 8 figs. **DWB**—Routine discussion with local (U. S.) and N. Hemisphere 700 mb charts and a chart for each month showing unusual event in each area of the U. S. March and April 1957 were notable for an unusual number of tornadoes, plus blizzards, cloudbursts, floods, droughts, freezes and record warm spells, particularly in the Great Plains and Texas. It was the wettest March in 50 yrs at Medford, Ore., and Yakima, Wash. One of the 2 blizzards caused 34 deaths in the Great Plains—worst since 1931 in that area. *Subject Headings:* **1. Abnormal spring, U. S. (1957) 2. Weather anomalies 3. United States.**—*M.R.*

10.6–129 551.506(261.2):627.92

*Netherlands. Meteorologisch Instituut, **Meteorologische en Oceanografische Waarnemingen Verricht aan Boord van Nederlandse Lichtschepen in de Noordzee,** [Meteorological and oceanographical observations taken from the Netherlands lightships in the North Sea], Vol. 4, 1952. Issued **1958.** 214 p. Also: Vol. 8, 1956, issued **1957.** 283 p. Both almost entirely tables. **DWB**—The volume for 1952 contains 3-hourly meteorological and oceanographic observations and hourly observations of currents at 3 Netherlands lightships in the North Sea. Dry and wet bulb temperature, wind direction and force, sea surface temperature, visibility, weather, direction, period and height of waves, time of high tide, monthly averages and frequencies of dry and wet bulb temperature and sea surface temperature, wind (vector and scalar and constancy), air-sea surface temperature, wind speed by directions and height and direction of waves. *Subject Headings:* **1. Lightship observational data 2. Annual marine meteorological data summaries 3. Netherlands lightships 4. North Sea 5. Netherlands.**—*M.R.*

10.6–130 551.506.3:551.506.8(431.1)

Mäde, A. (*Germany*), **Ueber den Aussagewert phänologisch-klimatologischer Karten.** [Information value of phenological-climatological maps.] *International Journal of Bio-*

climatology and Biometeorology, Leiden, Vol. 1 (Pt. 2, Phytological Bioclimatology), 1957 4 p. table, 7 refs., 5 figs. **DWB**—Climatic data and climatic maps based upon phenologica time intervals rather than upon time intervals of the civil year have been used in the Germa Democratic Republic for agricultural purposes. The value of precipitation maps based upo phenological time intervals is examined for the period between winter rye blossoming an harvesting; 39 years of phenological observations at Halle are used. The correlation betwee yield and rainfall for the interval between blossoming and harvesting was 0.03 with a maximu random value of 0.43. A correlation between yield and rainfall of 0.16 was obtained for rainfa totals which included rainfall exceeding 3 mm/day. Correlation coefficients were compute for five-day intervals beginning with blooming; highest correlations were obtained when th number of days with rainfall greater than 3 mm was used instead of precipitation amount values of 0.34 and 0.47 were obtained. The correlation analysis indicates that the use o plausible phenological dates does not lead to a climatological description more suited to de scribing biological processes. *Subject Headings:* **1. Climatic data for phenological period 2. East Germany.**—*I.L.D.*

10.6–131 551.506.1(492

*Netherlands. Meteorologisch Instituut, **Jaarboek., Pt. A, Meteorologie,** [Yearbook Pt. A, Meteorology], **1953.** pub. **1958.** 79 p. Also: **1954,** pub. **1957.** 179 p. Both almos entirely tables. "Beginning with 1953 issue, the tables are compiled mechanically by usin punched cards." **DWB, DLC**—Data from 6-1st order stations and 41–2nd order station include daily (8, 14 and 19h) values of pressure, temperature, relative humidity, vapor pressure precipitation, wind direction and speed, cloudiness, sunshine and hydrometers, maximum an minimum temperature, hourly observation of wind, sunshine, temperature and pressure (a 1st order stations), plus monthly and annual summaries of various elements. *Subject Heading* **1. Annual meteorological data summaries 2. Netherlands.**—*M.R.*

10.6–132 551.506.3:551.542:519.2(43

*Hodinková, Zdeňka, **Statistické zhodnocení stoletého pozorování atmosférického tlak v Brně-Pisárkách (1851–1950).** [Statistical analysis of 100 years of atmospheric pressur observations for Brno-Pisarky (1851–1950).] *Meteorologické Zprávy*, Prague, 10(6):153–15 **1957.** fig., 5 tables, 6 refs., eqs. Russian summary p. 153. **DWB**—Statistical characteristi of monthly and annual mean pressure at Brno-Pisarky are presented. The homogeneity data was achieved with the help of the pressure records for Bratislava, Prague and Vienn It appears that pressure deviations have a much wider range in winter than in summer, whic agrees with the weather situation in Central Europe. Pressure data are seldom analyzed an it was not possible, therefore, to compare the results with others. *Subject Headings:* **1. Pressur data 2. Statistical analysis of pressure data 3. Long period records 4. Brno-Pisark Czechoslovakia.**—*Author's abstract.*

10.6–133 551.506.7:551.557(058)(431.

*Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologisch Dienst, **Deutsches Meteorologisches Jahrbuch, 1955, Teil V, Heft 1. Höhenwindmessunge in Greifswald, Lindenberg, Dresden, Wernigerode und Leipzig-Mockau.** [German meteor logical yearbook, 1955, Pt. 5, Sec. 1, Upper wind measurements at Greifswald, Lindenber Dresden, Wernigerode and Leipzig-Mockau).] Issued Berlin, **1957.** 91 p. almost entire tables. **DWB**—A simple listing, without summarization, of the pilot balloon and radioson winds at Lindenberg, Dresden, Leipzig, Greifswald and Wernigerode. The data are tabulate by machine and are arranged by months and chronologically within each month. *Subj Headings:* **1. Upper air wind data 2. Annual upper air wind data reports 3. East German** —*M.R.*

INSTRUMENT CARRIERS

See also: **Space flight** (Bates), 10.6–4; **Rocket meas. in Arctic, Ft. Churchill** (La Gow et al.), 10.6–39; **Satellite tracking** (Massey, Boyd), 10.6–84; **Rocket soundings and U. S. and U.S.S.R. satellites** (Massey), 10.6–85; **Rocket communication systems** (Alekseev), 10.6–87; **Meteorites, White Sands, N. Mex.** (Berg, Meredith), 10.6–88; **Rocket exploration of the upper atmos.** (Blagonravov), 10.6–89; **Aerobee rockets** (Pressly), 10.6–90; **Upper atmos. res.** (Singer), 10.6–91; **Satellite instrumentation** (Ordway), 10.6–92; **Rawin techniques, Bulgaria** (Malinovski), 10.6–124; **Ionospheric diffusion** (Dalgarno), 10.6–172.

10.6–134 551.507.321.2:551.501.7:551.558

Shmeter, S. M., **Dvizhenie shara-zonda v uskorennom vozdushnom potoke.** [Movement of a pilot balloon in an accelerated air stream.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy,* No. 22:17–21, **1957.** 3 refs., 8 eqs. **DWB**—The methods of measuring vertical atmospheric currents according to the deviation of the real velocity of ascent of a pilot balloon from its mean (or computed) value as determined by observations of the motions of pilot balloons having a small mean ascent velocity. These methods are based upon assumptions that the pilot balloon has a slight inertia and is entirely subject to the vertical air motion. The correctness of this assumption is advanced by theoretical mathematical means. Equations are derived for computing the ascent velocity of a pilot balloon in an accelerated air current and it was found that the measurements of the velocities of vertical atmospheric motion from the rate of ascent of pilots give only rough approximations. Better results would be obtained by determining the acceleration of the pilots. *Subject Headings:* **1. Pilot balloon ascension rates 2. Vertical current measurement.**—*I.L.D.*

10.6–135 551.507.321.2:551.508.822:551.501.7

Sinha, K. L. (*Met. Office, Jodhpur*), **The coefficient of aerodynamic resistance of large balloons used in radiosonde-rawin ascents.** *Indian Journal of Meteorology and Geophysics,* Delhi, 9(3):255–258, July **1958.** fig., table, 19 refs., 5 eqs. **DWB, DLC**—The coefficient of aerodynamic resistance in the case of the large balloons that are employed for radiosonde-rawin flights has been worked out here with the help of the radiosonde observations. *Subject Headings:* **1. Radiosonde balloon drag 4. Balloon ascension rates.**—*Author's abstract.*

10.6–136 551.507.352:551.551:551.558

Shur, G. N., **Opredelenie vertikal'nykh skorosteĭ turbulentnykh poryvov vetra pri samoletnykh issledovaniiakh.** [Determination of the vertical speeds of turbulent gusts during airplane investigations.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy,* No. 22:9–16, **1957.** 5 figs., 2 refs., 5 eqs. **DWB**—The author describes the construction, underlying principles, and operations of an instrument capable of recording simultaneously vertical acceleration and vertical velocity of the center of gravity of an airplane. It involves the measurement of vertical acceleration with an accelerometer; transformation of the vertical acceleration, by means of a potentiometer inserted into a bridge circuit, into electrical quantity; integration of this quantity with time by means of an electrical integrator and optical recording of the electrical magnitudes. The principle of the electrical integrator, based upon the integrating properties of a rheostat capacity series for any given parameter, is described in detail with the aid of circuit diagrams. Also the calibration of the electrical integrator and the computation of vertical acceleration from the recorded data are described with the aid of the relevant equations. *Subject Headings:* **1. Vertical wind velocity measurement 2. Vertical acceleration 3. Gustiness measurement 4. Airplane turbulence observations.**—*I.L.D.*

INSTRUMENTS

See also: **High alt. radiosonde flights, Greenland** (Lowenthal), 10.6–19; **Rotating beam ceilometers,** 10.6–30; **Wind indicator instruction manuals,** 10.6–33; **Satellite instrumentation** (Ordway), 10.6–92; **Balloon ascension rates** (Sinha), 10.6–135; **special bibliog. on Ozone,** p. 920.

10.6–137 551.508.51:551.501.7:551.557

Rossi, Veikko (*Finnish Met. Off., Helsinki*), **A simple method for the computation of wind values from the Finnish radio theodolite record.** *Geophysica,* Helsinki, 6(2):121–125, **1957.**

3 figs., 2 refs., 3 eqs. **DLC**—Procedure worked out at Ilmala Observatory (1953–56) for us with radio theodolite observations is set forth. Geometrical theory, nomograph for calculatin elevation angle and grid table (protractor) with rule for graphical calculation of wind valu are presented, illustrated and their use described. Immediate comparison can be made o optical and radio theodolite results since distance scales are the same as for optical theodolit protraction. *Subject Headings:* **1. Upper air wind computation techniques 2. Radio theodolit protractors.**—*M.R.*

10.6–138 551.508.5

Yajima, Y., **On the time lag of Dines pressure-tube anemograph.** *Journal of Meteor logical Research*, Tokyo, 10(8):661–665, Aug. **1958.** 3 figs., 5 tables, 8 refs., 10 eqs. I Japanese; English summary p. 661. **DLC**—In the case of low wind speed, the flow in th pressure tube is laminar, while, in case of high wind speed, the flow is turbulent. So, in th two cases, the time lags of Dines pressure-tube anemograph are different. At high wind spee the time lag of Dines pressure-tube anemograph depends on the wind speed, period of fluctua tion, density and viscosity of air. The Dines pressure-tube anemograph now used at th Japan Meteorological Agency has an error of 5% or less at the recorded peak indication wit the period over 12.0 sec. *Subject Heading:* **1. Dines anemograph.**—*Author's abstract.*

10.6–139 551.501.3:551.508.7

Sonntag, D. (*Geophys. Inst., Leipzig*), **Die Skala des Haarhygrometers für normale un gewaltzte Haare.** [Hair hygrometer scale for normal and rolled hair.] *Zeitschrift für M teorologie*, Berlin, 8(10):314–320, Oct. **1954.** 3 figs., 5 tables, 17 refs. **DWB**—The auth compares measurements of relative humidity made with the aspiration psychrometer and ha hygrometers with normal and rolled hairs and with normal and rolled bundles of hair. Th hygrometers tested were those manufactured by Lange-Optik, Forster and Lambrecht. Th results led to changes in the amplitude lever and also indicated that the Gay-Lussac sca lacks general validity. Values obtained with descending measurements of relative humidit are recommended as the basis of the hygrometer scale since regeneration humidity presen an easily obtainable fixed point. Only one scale could be obtained for two hair bundles. Th thermodynamic humidity correction cannot be used since the hair does not stretch in accordan with the degree of saturation. *Subject Headings:* **1. Hair hygrometers 2. Hygrometer com parisons 3. Relative humidity.**—*Based on author's abstract.*—[*I.L.D.*]

10.6–140 551.508.7

Brun, R. J. and Vogt, Dorothea E. (*both, Lewis Flight Propulsion Lab., Cleveland*), **In pingement of cloud droplets on 36.5-percent-thick Joukowski airfoil at zero angle of atta and discussion of use of cloud measuring instrument in dye-tracer technique.** *U. S. Nation Advisory Committee for Aeronautics, Technical Note*, 4035, Sept. **1957.** 52 p. 18 figs., 2 table 12 refs. **DWB, DLC**—The trajectories of droplets in the air flowing past a 36.5-percent-thi Joukowski airfoil at zero angle of attack were determined. The amount of water in dropl form impinging on the airfoil, the area of droplet impingement, and the rate of droplet i pingement per unit area on the airfoil surface were calculated from the trajectories and cover large range of flight and atmospheric conditions. With the detailed impingement informati available, the 36.5-percent-thick Joukowski can serve the dual purpose of use as the princip element in instruments for making measurements in clouds and of a basic shape for estimati impingement on a thick streamlined body. *Subject Headings:* **1. Cloud droplet imping 2. Cloud measuring instruments.**—*NACA.*

10.6–141 551.508.761 551.576.12:778.

von Arx, William S. (*Woods Hole Oceanog. Inst.*), **"Dister": a displacement sequen stereoscope.** *Journal of Meteorology*, Boston, 15(2):230–231, April **1958.** fig. **DWB, DLC** Motion pictures of clouds or ground features made at right angles to the line of flight of a airplane generate, between successive exposures, a stereohaze equal in length to the produ of the velocity of the airplane and the interval of time between successive exposures. Wh a suitable rotating or polarizing chopper is synchronized with the projector it becomes possib to view one frame with one eye and the next frame with the other so that an impression

depth is revealed, provided the order in which the two eyes perceive successive frames is the source or the direction of flight and the rate of projection exceeds 10 frames per sec, so that persistence of vision will permit the successive images to be fused stereoscopically. The author describes the working of a rotary shutter coupled through a flexible shaft to an extension of the shutter shaft motion picture projector and a disc of polarizing material substituted for the flexible shaft and shutter and rotating just in front of the projection lens. *Subject Headings:* **1. Air-borne instruments 2. Displacement sequence stereoscope 3. Cloud moving picture photography.**—*I.L.D.*

10.6–142 551.507.352:551.508.765:551.578.11

Brown, Edward N. (*Univ. of Chicago*), **A technique for measuring precipitation particles from aircraft.** *Journal of Meteorology*, Boston, 15(5):462–466, Oct. **1958.** 7 figs., 9 refs. **DWB, DLC**—A brief review is presented of the methods available for airborne cloud-droplet measurements. A foil technique for measuring liquid precipitation particles (greater than 100μ diameter) is discussed with respect to development, calibration, flight testing, and application. *Subject Headings:* **1. Raindrop size distribution instruments 2. Airplane rainfall measurement.**—*Author's abstract.*

10.6–143 551.508.77:551.578.46

Grunow, J., **Erfahrungen mit der Gebirgs-Schneesonde des Österr. Hydrographischen Dienstes.** [Experience with the mountain snow sonde of the Austrian Hydrographic Service.] *Wetter und Leben*, Vienna, 9(3/5):72–75, **1957.** 4 refs. **DLC**—The construction and use of a snow probe designed by R. Wallenta for the Austrian Hydrographic Service is described. The actual operation of removing snow samples, the effect of compression of the snow column upon computed snow density and recent improvements to increase the efficiency of this mountain snow sonde are discussed. *Subject Headings:* **1. Snow sampling instruments 2. Snow sondes.**—*I.L.D.*

10.6–144 551.508.77

Kresge, Ralph F. (*U. S. W. B., Wash., D. C.*), **Report on comparison of shielded and non-shielded precipitation gage study.** *Eastern Snow Conference, 1956 and 1957, Proceedings*, Vol. 4:123–128, pub. **1957.** 4 figs. **DWB** (M06E14p)—Precipitation amounts obtained at island and shore stations in the Great Lakes region in Michigan, with gages equipped with Alter type windshields were compared with those obtained with unshielded gages. Sample graphs showing comparative amounts are presented. A study of the effect of wind speed on amounts measured with the two types of gages is being undertaken. *Subject Headings:* **1. Precipitation gage comparisons 2. Shielded precipitation gages.**—*G.T.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Extended forecasting textbooks, U.S.S.R.** (Kats), 10.6–11; **Forecast. terminology** (Sherrod, Neuberger), 10.6–66; **Artificial fog dissipation** (Downie, Smith), 10.6–93; **Local forecast. studies, Denver** (MacDonald), 10.6–94; **International met. codes and AIREP and POMAR reports,** 10.6–96; **Airplane turbulence obs.** (Pinus), 10.6–98; **Typhoon forecast.** (Goodman), 10.6–123; **Thickness anomalies** (Höiland, Pedersen), 10.6–219; **Lapse rate change-turbulence relationships, Calcutta** (Gangopadhyaya, Bose), 10.6–221; **Ceiling height forecasting** (Yamada), 10.6–259.

10.6–145 551.509:519.2

Gleeson, Thomas A., **Observational probabilities and uncertainty relations for meteorology.** Florida. State Univ. Dept. of Meteorology, Contract AF 19(604)-753, Scientific Report No. 6, June 15, **1958.** 23 p. 4 figs., 2 tables, 8 refs., 27 eqs. **DWB**—The probability that an atmospheric feature of a given size will be observed in a region with a network of stations randomly distributed relative to the feature is shown to be a function of the feature and region sizes, and the number of stations. The function is developed to give the probability of observing the feature in a network of stations with varying observational capabilities, and the probability of observing several features simultaneously. Applications to aircraft reconnaissance,

network design, climatology, and prediction are discussed, and effects of a variation in network density are considered quantitatively. Difficulties in meteorological observation are compared with those in atomic physics. Meteorological uncertainty relations, analogous to HEISENBERG's uncertainty relation for atomic particles, are obtained and examined. *Subject Headings:* **1. Probability forecasts 2. Network densities.**—*Author's abstract.*

10.6–146 551.509:519.2

Gringorten, Irving I. (*GRD, A.F. Cambridge Res. Center*), **On the comparison of one or more sets of probability forecasts.** *Journal of Meteorology*, Boston, 15(3):283–287, June **1958.** 7 tables, 6 refs., 15 eqs. **DWB, DLC**—General expressions for the expected score for accuracy, score for skill and for operational value of the forecasts are developed and discussed. The expressions are then applied to the special case of two-class predictors and predictand, and an example is given to illustrate how one set of probability forecasts can meet the operational requirements better than another set, even though both sets of forecasts are equally accurate and equally skillful. *Subject Heading:* **1. Probability forecasts.**—*Author's abstract.*

10.6–147 551.509.12:551.511.32:551.524.

Kurbatkin, G. P., **Opredelenie metodami gidrodinamiki godovogo khoda temperatury vozdukha na urovne moria.** [Determination by hydrodynamic methods of the annual regime of air temperature at sea level.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 2:228–243, **1957.** 8 figs., table, 47 eqs. **DLC.** Trans. into English by L. G. Robbins in the English-language edition of the *Izvestiia, Bulletin of the Academy of Sciences of the U.S.S.R., Geophys. Ser.*, No. 2:111–127, 1957, issued 1957 by American Geophysical Union. Trans. into English available. **DWB** (M24.32 K96de)—The author presents a more detailed theory for determining the effect of compression and bending of isotherms near coasts. The method permits the full estimation of heat flow from the soil and provides a solution which is influenced least by the gradual closing of the series by spherical integrals; in addition this solution is not associated with integrals for longitude and latitude. The determination of the annual march of atmospheric temperature at sea level is solved for the planetary scale. The dependence of heat properties of the earth's surface upon geographic coordinates is taken into account and equations are developed for determining it. The atmospheric processes are regarded as nonzonal disturbances of the zonal circulation and corresponding equations for zonal and nonzonal conditions are developed and solved. Computed examples are compared with observed data and with results obtained from other theoretical studies. *Subject Headings:* **1. Hydrodynamic temperature computation 2. Heat balance of atmosphere 3. Annual temperature variations**—*I.L.D.*

10.6–148 551.509.3:551.515.8(522.2)

Kinoshita, M., **A synoptic study of the formation of instability line over the eastern China Sea.** *Journal of Meteorological Research*, Tokyo, 10(6):457–463, June, **1958.** 11 figs., 7 refs., eq. In Japanese; English summary p. 457. **DLC**—In this paper, the author investigated the genesis of instability line over the eastern China Sea in the winter season. The analysis was carried out in mesoscale, using maritime meteorological data for Jan. 26, 1955 reported from many ships in the eastern China Sea. The instability line appeared first over the seas southwest of Chejudo Island in front of cyclone or cold fronts. It is considered that the genesis of the instability line was affected considerably by the configuration of continent and oceans and the Tsushima Warm Current running northward off the west coast of Kyushu as well as warm advection accompanied by a remarkable wet tongue. *Subject Headings:* **1. Synoptic conditions for instability lines 2. Mesoanalysis.**—*Author's abstract.*

10.6–149 551.509.3:519.1

Wilkins, Eugene M. (*U. S. W. B.*), **A note of forecast economics.** *Journal of Meteorology*, Boston, 15(2):237–240, April **1958.** fig., table, 4 refs., 6 eqs. **DWB, DLC**—THOMPSON and BRIER's equation (*Monthly Weather Review*, 83:249–254, **1955,** *see* 8.11–105, Nov. 1957, *MAB*) expressing the necessary accuracy for forecasts to improve climatic probabilities assumes equality of loss and cost errors. The author analyzes the situation when the two kinds of errors are not equally frequent. It is shown that cost of using categorical forecasts is higher

nan that of climatologic forecasts. The distribution of "loss errors" (c) to "cost errors" (b) giving the best economy when the categorical forecast scheme is compared with the use of limatic probabilities is analyzed. In order to make this comparison, the relationship of this atio to other variables, such a forecast accuracy and total number of misses, is derived. For Case I: ($P_c > C/L$) where P_c—probability of unfavorable weather, C and L protection cost and nprotected loss, respectively

$$\frac{c}{b} = \frac{(C/L)(A-P_c)}{(1-A)(1-C/L)-(C/L)(1-P_c)}$$

nd for Case II

$$(P_c < C/L); \qquad \frac{c}{b} = \frac{P_c(1-C/L)-(C/L)(1-A)}{(1-C/L)(1-A-P_c)}.$$

A graph of these equations showing the range of circumstances under which a given forecast cheme is competitive with climatic probabilities is presented, and the application of these quations to a probability forecast is outlined using a practical example. *Subject Headings:* . **Forecast accuracy 2. Probability forecasts 3. Economics of forecasts 4. Climatic probbilities.**—*I.L.D.*

10.6–150 551.509.31:551.509.2:551.515.8

Hubert, L. F. (*U. S. W. B., Wash., D. C.*), **Analysis aids for the American Tropics.** *Monthly Weather Review*, Wash., D. C., 86(6):201–218, June **1958.** 15 figs., table, 10 refs., eqs. **DWB, DLC**—Analysis of upper-level charts for the American Tropics, which is a largely ceanic area, is difficult because data are inadequate and are likely to remain so in the foreeeable future. Despite this handicap and the unsatisfactory character of the map, the 500 mb nalyses are routinely used for many different tropical forecasting procedures. Some aids re suggested for improving the analyses that are made to meet this continuing requirement. ince the lower troposphere is somewhat barotropic, pressure-height changes at 700 mb and 00 mb are largely a function of sea level pressure change so that a careful surface analysis long with a good differential analysis can yield great improvement in upper-air analysis ompared to a straightforward analysis of upper-air data. Maps of normal thicknesses, 000–700 mb, 700–500 mb, and 1000–500 mb, based on all constant pressure data from the merican Tropics are presented for the hurricane season. Statistics relative to these fields f thickness such as 24-hr changes, correlation between the upper and lower strata, and typical nomaly patterns, are included and discussed. In addition, several indicators of anomaly hich are useful in higher latitudes were investigated and found to be of limited value in this rea. Finally, it is concluded that tropical maps must be re-analyzed as late data become vailable and that analyses must be made under the control of thermal and time-continuity estraints discussed here. *Subject Headings:* **1. Upper air chart analysis 2. Synoptic analysis ids 3. Tropical analysis.**—*Author's abstract.*

10.6–151 551.509.31:551.542

*Just, D.; Sieland, K. and Polster, G., **Research on short-range weather prediction techiques by specifications of the weather according to the forecasted pressure distribution.** erlin. Freie Universität. Institut für Meteorologie und Geophysik, Contract AF 61(514)-46, Technical (Final) Report, Nov. 30, **1957.** 7 sections, separately paged. 15 figs., numerus tables. **DWB** (M09.3 B559te)—In the present research the relationship of the occurrence f fair, cloudy and overcast sky, of fog, precipitation and cloud height $h \leqq 3$ to the surface and 00 mb pressure pattern is investigated. For the period 1950–1957 daily synoptic data, the espective pressure distribution, wind direction and pressure change were entered into key unched cards for three German, three English, and three Russian stations. Evaluating nese punched cards, the frequency of the occurrence of the above-mentioned classes of sky nd weather condition in connection with different parameters of the pressure distribution was etermined and summarized in the form of tables. For each class the mean value of occurrence, xpressed as percentage, was computed, while for each combination with the different paramters the departure from the mean occurrence was calculated. As a means to assess the

capability of individual parameters to exercise an influence on the occurrence of a certa class, a so-called departure factor ΔM was introduced. The best results were obtained f the occurrence of precipitation and of fair skies. As to the parameters, the pressure distributi gives better results than the pressure change and the wind direction. Especially good valu were obtained for isobar curvature, high, low and trough at the surface, for high in 500 m wind speed $\geqq 50$ kn in 850 and 500 mb, as well as for larger amounts of 3- and 24-hr pressu changes. It can be definitely stated that in general the pressure distribution and pressu change at the surface exercise a stronger influence on sky and weather conditions than does t 500 mb level. *Subject Headings:* **1. Short range forecast research 2. Pressure distribution.** *Authors' abstract.*

10.6–152 551.547.5:551.557.2:551.509.3

Buell, C. Eugene (*Nuclear Div. Kaman Aircraft Corp.*), **The correlation between wi and height on an isobaric surface.** *Journal of Meteorology*, Boston, 15(3):309–316, June 195 10 figs., table, 4 refs., 20 eqs. **DWB, DLC.** Also same title issued as *Kaman Aircraft C poration. Nuclear Div., Albuquerque, N. M. Report* No. KN-47-1(R), June **1957.** 36 10 figs., table, 4 refs., 20 eqs. **DWB** (M51 B928co)—Since the two point correlations winds on an isobaric surface approximate those expected from a two-dimensional isotro turbulence, it follows that in a flow that is geostrophic the two point correlations of wind a height must have a specific functional form. The form of the two point correlation functi for wind and height is predicted from relations between this function and the correlation functi for the two point correlations of wind and the two point correlations of height. The theoreti predictions are compared with observational data and found to be reasonably well realized. T two point correlation function for wind and height is applied to height and wind observations a point for the estimation of these quantities at a distance of several hundred nautical mil *Subject Headings:* **1. Isobaric surfaces 2. Wind and height correlations.**—*Author's abstract*

10.6–153 551.508.43:551.509.312:551.54

Butorin, M. M., **Izmerenie vysot izobaricheskikh poverkhnosteĭ s pomoshch'iu vysotom rov dlia sostavleniia kart baricheskoĭ topografii.** [Measuring the heights of isobaric le with the aid of altimeters for the preparation of maps of baric topography.] *Meteorologii Gidrologiia*, No. 1:34–36, Jan. **1957.** table. **DWB, DLC.** Trans. into English availa **DWB** (M:629.13 B978me), **DLC**—The author suggests that the reports of pilots on the heig of isobaric surfaces, measured either with radio or barometric altimeters, can be used to c struct more exact charts of baric topography. According to Soviet regulations, airplanes at prescribed levels determined according to barometric heights beginning with 760 mm sea level. The use of such altimeters on airplanes, their standardization and necessary c rections, and the procedure for measuring air temperatures during flight, and the preparat of isobaric charts from such data are discussed. *Subject Headings:* **1. Baric topography cha 2. Isobaric surfaces 3. Altimeters.**—*I.L.D.*

10.6–154 551.509.58:551.515.2:551.461.2(7

*Kussman, Abraham S. (*U. S. W. B., New York City*), **The storm surge problem in N York City.** *New York Academy of Sciences, Transactions*, Ser. 2, 19(8):751–763, June 19 2 figs., 2 tables, 10 refs., eqs. **DLC**—The general problem of meteorological tides and specific effects of major cyclonic storms or hurricanes on the maximum surge level at 9 differ points on Long Island or nearby coastal places are discussed. Various factors affecting surge are analyzed with respect to the Long Island situation. Research conducted storms (1950–56) to give quantitative estimates of maximum surge based on theory and deri formulas, cross sections of tidal heights for main hurricanes and cross sections along south north shores of Long Island for the Sept. 21, 1938 hurricane, the deviation correlation betw various tide gage stations in the New York and Long Island area and, finally, the meteorolog tide vs. the pressure gradient are treated. Forecasts need further testing. *Subject Headi* **1. Storm surges 2. Hurricane tide forecasting 3. Long Island, N. Y.**—*M.R.*

10.6–155 551.509.59:551.542

White, R. M.; Cooley, D. S.; Derby, R. C. and Seaver, F. A. (*all, GRD, A.F. Camb. Res. Center*), **The development of efficient linear statistical operators for the prediction of sea-level pressure.** *Journal of Meteorology*, Boston, 15(5):426–434, Oct. **1958.** 7 figs., 4 tables, refs., 12 eqs. **DWB, DLC**—The design of efficient linear statistical operators for the 24-hr prediction of the sea-level pressure distribution over the U. S. is considered. Factor analysis techniques for reduction and selection of independent variables in regression analysis are used as a means of obtaining efficient statistical forecasting equations. The effects of the variations in data density in time and space, and the extent of geographical coverage upon the explained variance of the sea-level pressure are examined. *Subject Headings:* **1. Sea level pressure forecasting 2. Statistical forecasting 3. Factor analysis.**—*Authors' abstract.*

10.6–156 551.509.616:551.576.11(79)

Battan, Louis J. (*Univ. of Chicago*) and Kassander, A. Richard, (*Univ. of Arizona*), **Randomized seeding of orographic cumulus, 1957, Pt. 1.** Chicago. Univ. Dept. of Meteorology, Cloud Physics Lab. Contract AF 196(604)-1388, Technical Note, No. 12, Feb. 15, **1958.** 7 p. 4 figs. (incl. photo), 3 tables, 3 refs. **DWB** (M74.1 C532 ten)—During July and Aug. of 1957 groups of orographic cumulus over the Santa Catalina Mts. in southeastern Arizona were seeded with an airborne silver iodide generator. The design of the experiment included (1) an objective scheme for predicting days eligible for seeding, that is, days on which large cumulus congestus developed; (2) a randomization procedure whereby one-half of the eligible days were seeded; and (3) a network of 29 recording rain gages, two radar sets and suitable photogrammetric equipment for observing the effects of the seeding. This report deals with the description of the design of the experiments and a summary of the analysis of the rain gage data. During the summer of 1957 there were 16 pairs of days studied. The analysis suggests that seeding had a positive effect, but statistical tests show that the differences between the rainfall on seeded and nonseeded days could not be shown to be statistically significant at an acceptable confidence level. In view of the results, it is planned to repeat the experiments during the summer of 1958. With additional observations it should be possible to draw definitive conclusions regarding the effects of seeding on the rainfall from orographic cumulus clouds. *Subject Headings:* **1. Cloud seeding of orographic clouds 2. Cloud seeding evaluation 3. Cloud seeding with silver iodide 4. Santa Catalina Mountains, Ariz.**—*Authors' abstract.*

10.6–157 551.509.616:551.576.11(79)

Battan, Louis J.; Kassander, A. Richard and Sims, Lee L., **Randomized seeding of orographic cumuli, 1957, Pt. 2.** Arizona. Univ. Institute of Atmospheric Physics, Scientific Report No. 9, Oct. 1, **1958.** 11 p. 4 figs., 10 refs. **DWB** (M08.21 A719s)—During July and Aug. 1957, orographic cumuli over the Santa Catalina Mts. of southeastern Arizona were seeded from an airplane with silver iodide. The experimental design of the program involved the randomized seeding by pairs of days; one of two days with suitable clouds was seeded on a random basis. On seven pairs of days, observations were made of the cumuli with a pair of K-17 cameras on a 1.3 mi baseleg. At the same time, radar observations were made with a 3-cm vertically-scanning radar set. On the basis of the analysis of the camera and radar observations an investigation has been made of the occurrence of precipitation as a function of cloud size and temperature. It was found that there is a large variability in cloud behavior from year to year. Natural clouds in the arid southwest do not produce precipitation until their vertical thicknesses are of the order of at least 8 to 10,000 ft. From a comparison of seeded and non-seeded clouds it appears that the silver iodide particles may have produced changes in the precipitation formation mechanisms in orographic cumuli. *Subject Headings:* **1. Cloud seeding of orographic clouds 2. Cloud seeding evaluation 3. Cloud seeding with silver iodide 4. Santa Catalina Mountains, Arizona.**—*Authors' abstract.*

10.6–158 551.509.616:551.576.11(75)

Clouds, carbon and change. *Naval Aviation News*, Wash., D. C., Oct. **1958,** p. 20–23. Photos. **DWB**—Illustrated account of tests made by Florence W. Van Straten (meteorologist of the Naval Weather Service) on July 29–31, 1958, over the Florida Coast, using carbon black to dissipate cumulus clouds (7 cases of "seeding" produced dissipation within 20 min).

In other cases, clouds were created by this method. The principle is explained in terms of t creation of a temperature differential at the base of, or in, the cloud, or at the top of the clo by using the high radiation absorption potential of carbon black. At high (60° to 65° cloud temperatures even a 1°F differential in droplet temperature creates a vapor pressu differential sufficient to cause drop accretion on the colder droplet. *Subject Headings:* **1. Clo modification with carbon black 2. Carbon black 3. Florida Coast. I. Van Straten, Floren W.**—*M.R.*

10.6–159 551.509.616:551.576.11(4

Suprunenko, P., **Upravlinnia khmarami.** [Cloud modification.] *Ukraina*, Kiev, N 23(182):15, **1956. DLC** (Slavic)—A simply written account of the development of artific rainmaking in the U.S.S.R. in which the author recounts how MIROSHNICHENKO, a teacher a an amateur physicist, developed gradually into a rainmaking specialist, organized a laborato of "cloud physics" in his school at Zaporozhe, and invented a new spray for seeding clou During his study, he obtained the following data: in 1 cm^3 of cloud there are usually 120,0 droplets; after treating the cloud with his spray the number of drops is reduced to 80,0 This means that the droplets coalesced, grew and became raindrops. If sprayed with anotl preparation, the number of drops increases, but they become smaller, and the cloud dissolv Experiments are being continued. *Subject Headings:* **1. Cloud seeding in U.S.S.R. 2. Clo seeding techniques 3. Zaporozhe, U.S.S.R.**—*A.M.P.*

10.6–160 551.509.616:551.594

Vonnegut, Bernard and Moore, Charles B., **Preliminary attempts to influence convect electrification in cumulus clouds by the introduction of space charge into the lower atmosphe** Arthur D. Little, Inc., Contract Nonr-1684(00), [Unnumbered report], **1958.** 24 p. figs., 13 refs. **DWB** (M94 V947pr)—If electrification of cumulus clouds is initiated by fair-weather space charge in the air from which they develop, it should be possible to influe their electrification by introducing sufficient amounts of electric charge into the lower mosphere. In preliminary experiments carried out during the spring and summer of 1957 Jacksboro, Tex., approximately one milliampere of negative electricity was released fron wire 7 km long and 10 m above the ground. The resultant negative space charge was sufficie to reverse the fair-weather electric field for about 8 km downwind. An electric field meter 7 downwind showed that when low level cumuli growing from the charged air passed overhe the field became more strongly anti-fair-weather. These observations indicate that the ne tive space charge was carried by updrafts into the cloud. Because of lack of adequate strumentation, we could not determine the effect of the charged air on the subsequent electri development in the cloud. *Subject Headings:* **1. Convective cloud electrification 2. Cl modification experiments.**—*Authors' abstract.*

10.6–161 551.509.617:551.57

Reynolds, Robin R., **Santa Barbara project.** (In: U. S. Advisory Committee on Weat Control, **Final Report, 1957.** 2:249–252. 3 figs.) **DWB, DLC**—The Santa Barbara Pro is a research program specifically designed with the necessary scientific control and instrume tion to test the efficiency of the widely used method of AgI cloud seeding to increase precip tion by using ground based silver iodide smoke generators. The cooperative agencies project directors are listed. The project responsibilities, operational procedures and evaluat program are described. A map showing the subdivision of the target and the locatio AgI smoke generators and photographs of the type of generators used and the radar installa are presented. *Subject Headings:* **1. Project Santa Barbara 2. Cloud seeding with silver iod 3. Silver iodide smoke generators 4. Cloud seeding evaluation.**—*I.L.D.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See: **Bibliog. on Ozone,** p. 920.

ATMOSPHERIC POLLUTION

See also: **Dust** (Adler), 10.6–21; **Diffusion of gases** (Smith et al.), 10.6–210.

10.6–162 551.510.42(75)

Hendrickson, E. R., **Industrial atmospheric pollution.** *Florida. Univ., Gainesville, Engineering and Industrial Experiment Station, Engineering Progress at the University of Florida,* 11(10), Suppl., Oct. **1957**; *Leaflet Series,* No. 95. 10 p. reprint from *Florida Engineering Society, Journal,* 11(3), Oct. **1957.** 7 figs., 5 refs. **DWB**—This publication on engineering progress from the Univ. of Florida, Gainesville, Fla., is mainly on the meteorological factors of principal concern in the dispersion of polluting materials. These include precipitation, wind velocity and direction and the vertical temperature gradients. Four cases of air diffusion are cited and a number of illustrative drawings provided. *Subject Headings:* **1. Atmospheric pollution 2. Florida.**—*N.N.*

10.6–163 551.510.42

Leavitt, J. M.; Pooler, F., Jr. and Wanta, R. C. (*all, U. S. W. B. Research Station, Robert A. Taft, Sanitary Engineering Center, Cincinnati*), **Design and interim meteorological evaluation of a community network for meteorological and air quality measurements.** *Air Pollution Control Association, Journal,* 7(3):211–215, Nov. **1957.** 5 figs. **DWB, DLC**—Meteorological and air quality measuring network designed and installed at Louisville, Ky., for the purpose of studying air pollution was undertaken jointly by city, Jefferson County, state and federal agencies. The report of this project was then presented at the 50th Annual meeting of the Air Pollution Control Association held at St. Louis, Mo., during the period June 2–6, 1957. Preliminary results indicate that the network data do qualitatively describe the air flow and air quality patterns. This qualitative understanding was considered necessary and preliminary to more quantitative descriptions. *Subject Headings:* **1. Atmospheric pollution studies 2. Air sampling and analysis 3. Louisville, Ky.**—*N.N.*

10.6–164 551.510.42:551.555.8(669)

McKeown, H. D. J. (*Bishop's Stortford College, Herts.*), **Dust concentrations in the Harmattan.** *Royal Meteorological Society, Quarterly Journal,* London, 84(361):280–282, July **1958.** table, 5 refs., 2 eqs. **DWB, DLC**—A method of counting the very fine dust particles of the Harmattan and of determining their approximate size range is described, and some of the counts obtained at Ibadan, Nigeria, during the 1955–56 season are presented. It is suggested that the large dust concentrations may have a blanketing effect on terrestrial radiation. *Subject Headings:* **1. Harmattan 2. Dust counting techniques 3. Dust effects on terrestrial radiation 4. Ibadan, Nigeria.**—*Author's abstract.*

10.6–165 551.510.42:551.578.1

May, F. G. (*U. K. Atomic Energy Authority Res. Group, Harwell*), **The washout of lycopodium spores by rain.** *Royal Meteorological Society, Quarterly Journal,* 84(362):451–458, Oct. **1958.** fig., 3 tables, 8 refs., 9 eqs. **DWB, DLC**—This report describes the determination of the washout coefficient of lycopodium spores by rain. The experimental results are in good agreement with those obtained theoretically by CHAMBERLAIN (1953) after allowance has been made for the varying raindrop spectra of different types of rain. *Subject Headings:* **1. Pollen washout by rain 2. Scavenging by rain.**—*Author's abstract.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Solar corpuscular influences on upper atmos.**, 10.6–3; **Rocket meas. in Arctic, Ft. Churchill, Canada** (La Gow et al.), 10.6–39; **Ionosphere data, Macquarie Is.** (Major), 10.6–42; **Aerobee rockets** (Pressly), 10.6–90; **Upper atmos. res.** (Singer), 10.6–91; **Ionospheric drift meas., Wash., D. C.** (Agy), 10.6–169; **Ionospheric wind meas. tech.** (Banerji), 10.6–236; **Ionospheric conductivity** (Kamiyama, Sato), 10.6–320; **Upper air research** (Link), 10F–72; **bibliog. on Ozone,** p. 920.

10.6–166 551.510.53:551.510.41:551.507.362

Kamiyama, Hiroshi (*Geophysical Inst., Tohoku Univ.*), **Physical states of the upp atmosphere.** *Tohoku University, Science Reports, Fifth Series, Geophysics*, 9(2):45–54, Oc **1957.** 6 figs., table, 18 refs., 19 eqs. **DWB, DLC**—Taking account of the dynamical effec such as the diffusion and the mixing, both of which are preventive of the photochemical equilil rium, the atmospheric elements at various altitudes are evaluated on the basis of the rock data. The photodissociation of oxygen occurs in a thin layer lying near 100 km level, b the oxygen molecules may exist to a considerable amount even at 200 km due to the mixi effect of winds. The diffusion is not operative effectively in the region below 200 km. Th downward velocity of the diffusion for nitrogen becomes appreciable above 220 km, so that t atmosphere above this level may be in diffusive equilibrium. Assuming the fraction of u dissociated oxygen, with reference to the results from rockets, scale heights and consequent temperatures are calculated from the rocket data of atmospheric densities. With these value pressures and concentrations for respective constituents are derived and tabulated in the la section of the paper. Since no experimental datum is yet available above 220 km, a speculati evaluation is made on some assumptions. The results are significantly small compared wit those shown by the Rocket Panel. *Subject Headings:* **1. Upper atmospheric physics 2. Phot dissociation of oxygen 3. Rocket data.**—*Author's abstract.*

10.6–167 551.510.528(265):551.582(5

Neyema, Y., **Relation between climate of Japan in summer season and height variati of tropopause over Marcus Island.** *Journal of Meteorological Research*, Tokyo, 10(2):112–11 Feb. **1958.** 10 figs., 2 tables, 11 refs. In Japanese; English summary p. 30. **DWB, DLC** In this paper the author examined the variation of tropopause height over Marcus Island a its application to climate forecasting of Japan in the summer. The results are as follow 1) smoothed variation of tropopause height over Marcus Island in summer is generally classifie into three different types, that is: (A) M-type with short period and small amplitude, (B) G type with long period and (C) S-type with large amplitude; 2) the wave perturbation tropopause height propagates from Marcus Island to West Japan in about 22 days; 3) G-typ and M-type pattern over Marcus Island antedate the cutting-off of lows or highs in the weste zone over the Far East; 4) S-type pattern over Marcus Island is accompanied by southwa extension of the North Pacific High. *Subject Headings:* **1. Tropopause height variatio 2. Summer climate-tropopause height relationships 3. Marcus Island 4. Japan.**—*Autho abstract.*

10.6–168 551.510.53:541.1

Bialecke, E. P. and Dougal, A. A., (*both, Dept. of Electrical Engin., Univ. of Illinois*) **Pressure and temperature variation of the electron-ion recombination coefficient in nitroge** *Journal of Geophysical Research*, Wash., D. C., 63(3):539–546, Sept. **1958.** 4 figs., 11 ref **DLC**—The electron-ion recombination coefficient a_{ei} in ionized nitrogen gas is investigated to its variation with pressure (0.2 to 2 mm Hg) and electron temperature (92°K to 300°K corresponding to various low electron energies. At 1.3 mm Hg, a_{ei} varies from about 8.5×10 cm^3/sec at 300°K to 6.7×10^{-6} cm^3/sec at 92°K, almost an order of magnitude differenc Discussion of the possible modes of recombination in a nitrogen gas plasma is given and di sociative recombination is found to be the most probable means of electron loss. Microwa transmission methods were used in this study. *Subject Heading:* **1. Recombination in nitroge** —*Authors' abstract.*

10.6–169 551.510.535:551.557

Agy, Vaughn (*Natl. Bu. of Standards, Boulder, Colo.*), **Results of ionospheric drift measurements in the United States.** (In: Polar Atmosphere Symposium, Oslo, July 2–8, 1956, **Proceedings, Pt. 2, Ionosphere Section.** N. Y., Pergamon Press, **1958.** p. 23–25. 2 figs.) **DWB.** Also issued in: *Journal of Atmospheric and Terrestrial Physics*, London, Special Supplement, Pt. 2, 1957, pub. **1958.** p. 23–25. 2 figs. **DLC**—The Bureau of Standards suspended its work on drift measurements for about 2 years but with the help of similar reports from Ottawa, Canada and Cambridge, Eng., a summary has been made for the polar plot of daytime E-region winds covering the years July 1950–June 1953. The result shows that the wind vector blows away from the origin of the charts; that during the winter there is a pronounced clockwise rotation in the phase of the wind and direction of the average wind changes through the year. The data were taken near Wash., D. C. But some recent work has been done at Puerto Rico by using two frequencies, 2.33 Mc/s and 4.57 Mc/s, and determining the effects of the correlation method with that of similar fades. *Subject Headings:* **1. Ionospheric drift measurements 2. Washington, D. C.**—*N.N.*

10.6–170 551.510.535:550.38

Appleton, Sir Edward (*Edinburgh Univ.*), **Regularities and irregularities in the ionosphere.** (In: Beer, Arthur (*ed.*), **Vistas in astronomy.** pub. London, **1955–1956.** Vol. 2:779–790. 5 figs., table, 17 refs., 18 eqs.) **DWB, DLC** (520.82 B415v)—A general survey of ionospheric phenomena is given, in which the regular variations of the E and F_1 layers, as illustrated by their intimate dependence on the sun's zenith distance, are contrasted with the anomalous behavior of the F_2 layer. Using results from the world's ionospheric stations, such anomalous behavior is identified as geomagnetic distortion, most probably due to atmospheric tidal action operating on an ionized medium in the presence of the earth's magnetic field. As an illustration of such geomagnetic control it is shown that, in the F_2 layer, the region of change-over from the Northern to the Southern Hemisphere type of variation is more nearly coincident with the magnetic equator than with the geographic equator. *Subject Headings:* **1. Ionospheric anomalies 2. Magnetic equator 3. F layers.**—*Author's abstract.*

10.6–171 551.510.535:621.396

Bailey, V. A. (*U. of Sydney, Aust.*) and Goldstein, L. (*U. of Ill.*), **Control of the ionosphere by means of radio waves.** *Journal of Atmospheric and Terrestrial Physics*, London, 12(2/3): 216–217, **1958.** 8 refs. **DLC**—As a radio wave traverses an ionized gas, consequently raising its temperature, energy is produced. But in the absence of some source of ionizing energy the gaseous plasma disappears. Radio waves of sufficient intensity affect the ionization produced by solar radiation or other agencies in any region of the ionosphere, even when the temperature is as low as 250–300°K. When a rise in temperature has changed the rates of different processes of diffusion, attachment and recombination ionization can still be controlled by the establishment of radio stations on the ground especially when the controlling waves have their frequencies near the gyro-frequency of electrons in the ionospheric region concerned. *Subject Heading:* **1. Ionosphere control by radio waves.**—*N.N.*

10.6–172 551.510.535:551.507.362.1

Dalgarno, A. (*GRD, ARDC, Bedford, Mass.*), **Ambipolar diffusion in the F2 layer.** *Journal of Atmospheric and Terrestrial Physics*, London, 12(2/3):219–220, **1958.** table, 18 refs., 4 eqs. **DLC**—The densities of the diffused free-charges in the F2-layer are considered too small by a factor of at least 4 or 5 and unacceptable rapid at the neutral particle concentration as indicated by rocket measurements. Several scientists and their research on the mobilities of ions in their gaseous states are referred to. The commonly accepted diffusion coefficient D, for an ion of mass M_1 in a gas composed of particles of mass M_2, is expressed thus:

$$D = \frac{3\pi^{\frac{1}{2}}}{16N_2}\left(\frac{2kT}{\pi}\right)^{\frac{1}{2}}P^{-1},$$

where k is Boltzmann's constant; T, the absolute temperature; π, the reduced mass $M_1M_2/(M_1+M_2)$; N_2, the gas number density; and P, the average effective diffusion cross-section.

This is an important parameter in the discussions. *Subject Headings:* **1. Rocket measuremen in ionosphere 2. Ionospheric diffusion.**—*N.N.*

10.6–173 551.510.535:551.594.1

Duncan, R. A. (*Radio Res. Labs., Commonwealth Sci. & Industrial Res. Organiz., Au tralia*), **Computations of electron density distributions in the ionosphere making full allowanc for the geomagnetic field.** *Journal of Geophysical Research*, Wash., D. C., 63(3):491–49 Sept. **1958.** 3 figs., 18 refs., 18 eqs. **DLC**—JACKSON's method of computing electron densit distributions from h'f records has been modified slightly and adapted for use on an electron computer. Reduction of a single h'f record takes about 20 sec of computer time. The metho makes allowance for the geomagnetic field and is exact save for the uncertainty about th electron density between ionospheric layers which is inherent in the method of pulse soundi from the ground. Rocket measurements (SEDDON et al., 1954) enable a reasonable resolutio of this uncertainty. Some examples of electron density distribution at Brisbane are give It is shown that the night-time distributions are much closer to the Chapman than the parabol form. This is to be expected (MARTYN, 1956) in a region in which the electron distribution determined by the opposing processes of downward diffusion under gravity, and a heigh gradient of electron decay. The effect of geomagnetic disturbance on the day and nigh electron density profile is illustrated and discussed. *Subject Heading:* **1. Ionospheric electro density computation.**—*Author's abstract.*

RADIOACTIVITY

See: **Radiation hazards and radioactive fallout effects** (Aurand), 10.6–116; **Sea salt nuclei and sea spray radioactive fallout sampling** (Farlow), 10.6–247.

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Hydrodynamic temp. computation** (Kurbatkin), 10.6–147; **Zonal transfer of momentum** (Arakawa), 10.6–182; **Temp. meas. and heat exchange ocean-atmos.** (Walden), 10.6–205.

10.6–174 551.511.32:551.513

Saltzman, Barry (*MIT*), **Some hemispheric spectral statistics.** *Journal of Meteorolog* Boston, 15(3):259–263, June **1958.** 3 figs., table, 14 refs., 11 eqs. **DWB, DLC.** Also i Massachusetts Institute of Technology, Dept. of Meteorology, Contract AF 19(604)-100 Final Report, Dec. 31, **1957.** p. 84–99. 3 figs., table, 12 refs., 11 eqs. **DWB**—The resul of computations of the spectrum of the eddy kinetic energy, the angular momentum transpor and the transfer of kinetic energy between the eddies and the mean motion, for the month Jan. 1949, are presented. The calculations are based on geostrophic winds measured at th 500 mb level. Of greatest interest is the finding that, for the month, disturbances of wav number three were of singular importance as a source of the energy of the mean zonal motio *Subject Headings:* **1. Kinetic energy spectrum in atmosphere 2. Angular momentum transfe** —*Author's abstract.*

10.6–175 551.511.33:551.515

Sirotkin, Ia. A., **K transformatsii dvizhushchikhsia vozdushnykh mass.** [Transformatio of moving air masses.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, No. 43(70):64–8 **1956.** 3 figs., 12 refs., 102 eqs. **DWB, DLC**—The author presents a theoretical mathematica analysis of the thermal transformation of moving air masses in the equation of heat balanc taking into account vertical velocities and the long wave radiation of the underlying surfac Equations are developed relating to the large scale transformation of air masses, for the pa ticular case involving the influence of the vertical component of wind velocity upon the tran formation, for a quasi-stationary solution, and for a large scale transformation when $W=a$ *Subject Headings:* **1. Air mass transformation 2. Heat balance of atmosphere.**—*I.L.D.*

10.6–176 551.511.32:551.55

Vasil'chenko, I. V., **Priblizhennyĭ termodinamicheskiĭ analiz lokal'nykh voskhodiashchik tokov v atmosfere.** [Approximate thermodynamic analysis of local ascending currents in th

nosphere.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 72:3–18, **1957.** igs., 19 refs., 60 eqs. **DLC**—A highly theoretical paper in which the author attempts to ve the problem of obtaining the thermodynamic characteristics of an already-formed tionary current in a calm atmosphere. *Subject Headings:* **1. Vertical current theory Local circulation.**—*A.M.P.*

10.6–177 551.511.32:551.551

Ogura, Y. (*Geophysical Inst., Univ. of Tokyo*), **A note on the energy transfer in Burgers' odel of turbulence.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the urnal,* pub. Nov. **1957.** p. 92–94. 2 figs., 5 refs., 7 eqs. **DWB, DLC**—The distribution of ergy transfer between eddies of different sizes is examined, on the basis of Burgers' model turbulence, for a special form of the energy spectrum of turbulence. Uses are made of the tistical hypothesis that fourth-order mean values are related to second-order mean values they would be for a normal probability distribution. In particular, the exact solution of e inviscid equation for the velocity gradient is obtained and it is shown that the mean-square lue of the velocity gradient increases to infinity within a finite time. *Subject Heading:* **Turbulent transfer of energy.**—*Author's abstract.*

10.6–178 551.511.33:551.521

Anido Artiles, Agustín, **El calor como causa primera de los fenómenos meteorológicas.** leat as a prime factor in meteorological phenomena.] *Cuadernos de Meteorología,* Santa ara, Cuba, 1(4), Oct. **1957.** 51 p. illus., fig., eqs. **DWB** (M(05) C961 V.1, No. 4)—In s outline of a university course entitled **Introduction to the study of meteorology** the sources d processes involved in the heat and radiation balance of the atmosphere are discussed, mely: the earth's interior as a source of heat, the sun's temperature and radiation, the solar nstant, warming of the earth's surface by solar radiation, atmospheric transfer of heat ffect of clouds), temperature distribution over the globe and factors affecting it (latitude, derlying surface, topography). *Subject Headings:* **1. Heat balance 2. Radiation balance.** *G.T.*

10.6–179 551.511.33:551.576.2

Antal, Emánuel, **A fölmelegedés mértékének összefüggése a felhőzettel.** [Relation be- een warming and cloudiness.] *Időjárás,* Budapest, 61(3):165–172, May/June **1957.** fig., ables, 4 refs., eqs. Russian summary p. 165; English version p. 225–230. **DLC**—Relations tween warming and cloudiness on near advection-free days are investigated. By means of riations in the values of warming, it is found that in some cases cloudiness is not an adequate dicator of warming even in the absence of advection. A statistical analysis shows that the ation between warming and cloudiness can be approximated with sufficient accuracy with a rd order equation. Observed and calculated values of warming as a function of cloudiness compared. *Subject Headings:* **1. Warming-cloudiness relationships 2. Advection free days Nonadvective temperature change.**—*Trans. of author's abstract* (*G.T.*).

10.6–180 551.511.33:551.524.31

Haltiner, G. J. (*U. S. N. Postgraduate School*), **The diurnal temperature wave with a efficient of diffusivity which varies periodically with time and exponentially with height.** *urnal of Meteorology,* Boston, 15(3):317–323, June **1958.** 10 figs., 3 tables, 7 refs., 17 eqs. **VB, DLC**—The partial differential equation for heat diffusion is numerically integrated by Runge-Kutta method. Solutions are obtained for the diurnal temperature variation h a bounded coefficient of eddy diffusivity which varies periodically with time and ex- nentially with height. The surface wave is represented by the sum of a diurnal and semi- rnal harmonic wave. The results may be interpreted to apply over a fairly broad range diffusivity values and height. With appropriate choices of the various parameters, reason- y good agreement is obtained between theoretical and observational values of amplitude uction and phase lag as functions of height and time. *Subject Headings:* **1. Heat diffusion iations 2. Diurnal temperature variations.**—*Author's abstract.*

10.6–181 551.511.33:551.543.1:551.524

Masalova, S. P., **Sutochnyĭ khod davleniia i sredneĭ temperatury vozdushnoĭ kolon** [Diurnal variations of pressure and mean temperature of a column of air.] *Leningr Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 71: 145–155, **1957.** 3 figs., 2 tables, refs., 8 eqs. **DWB** (M(055) U581tG)—On the basis of contemporary developments in dyna meteorology and climatology, which permit the computation of the mean daily variation temperature in a column of the atmosphere, the author develops a method for determining diurnal variations of pressure from the diurnal temperature variations. From the system equations for disturbed atmospheric movement and the equation of heat advection, ther derived a closed system of equations which coincides with the equations describing tides an ocean of constant depths covering the entire earth. The potential of disturbed for $-1/g(RF+\pi)$ consists of two parts, namely, the tide forming potential π and the poten RF associated with the daily variations of temperature at level $C=1$. A method for calculat the daily temperature variations in a column of air by means of the equation of energy bala is presented. The application of this method is illustrated by calculating the temperat for each hour of the day and amplitude of temperature oscillations averaged for June for points at different latitudes from 62°N to 30°N. No amplitude increased southwards. T increase is associated with the increased amplitude of the daily variation of turbulent heat f and with short wave solar radiation absorbed by the atmospheric columns. Also the te perature oscillations in the free atmosphere resulting from absorption of short wave radiat were computed. *Subject Headings:* **1. Diurnal temperature variations 2. Diurnal press variations 3. Temperature-pressure relationships.**—*I.L.D.*

GENERAL CIRCULATION

See also: **Atmos. circulation, Antarctica** (Krichak), 10.6–40; **Kinetic energy spectrum in atmos.** (Saltzman), 10.6–174; **Atmos. circulation experiments** (Riehl, Fultz), 10.6–238.

10.6–182 551.513:551.511

Arakawa, Akio (*Met. Res. Inst.*), **On the maintenance of zonal mean flow.** *Papers Meteorology and Geophysics*, Tokyo, 8(1):39–54, April **1957.** 4 figs., 17 refs., 41 eqs. **DWB** Assuming that the longitudinal phase of each wave component of disturbance takes rand values, relations which hold among mean eddy transports have been found in the case o stationary mean. In the middle latitudes, where the horizontal eddy transport of hea northward, the vertical eddy transport of heat is expected to be upward from one of th relations, causing the transformation from eddy potential energy to eddy kinetic ene As to the vertical eddy transport of momentum, it seems to be upward not only in low latitu but also in middle latitudes. This suggests, from the balance requirement of angular mom tum, that the downward transport of angular momentum by frictional effects, in addition the indirect meridional circulation, cannot be so small in magnitude as hitherto conside Combining these relations among eddy transports with the equations for the balance of angu momentum and thermal energy, it has been found possible to express the relation between distributions of mean zonal flow and heat source. Detailed discussions for this expression left for future studies, but the observed relation between them can be thus explained at le qualitatively. *Subject Headings:* **1. Zonal transfer of momentum 2. Vertical exchange momentum.**—*Author's abstract.*

10.6–183 551.513:551.553

Vitvitskiĭ, G. N., **Tsirkuliatsiia vozdukha nad Kitaem.** [Atmospheric circulation o China.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:35–44, **1956.** 5 figs., 20 r **DWB**—The author shows that the atmospheric circulation over China is not purely monso but is the result of the interaction of monsoonal and trade wind circulation complicated by effect of the orography of Central Asia. The Asian anticyclone is not simply of monso origin. The west-east transport prevailing at 3 km divides into a northeast and a south branch when it encounters the Central Asian mountain systems. Under orographic influe the air transported by the northern branch accumulates and favors the development of up altitude ridges which form the surface anticyclone which together with the westerly

mbines with the west-east transport of the middle latitudes to form the surface anticyclone. ıe increased frequency of the number of cyclones in northern China during March and April dicates the division of the Asiatic anticyclone into two parts—the northern part influenced orographic factors and the southern by the trade wind circulation. A result of the prev- ence of west-east transport at latitudes 15°–20°N is that the subtropical zone of high pressure displaced to the south. In the northern margin of the subtropical belt of high pressure in unan and Kwangsi provinces, dry and warm air of westerly origin is transported. Along the stern margin of the Asian anticyclone, cold and dry continental air is transported south- ırds—the winter monsoon of China. A detailed account is given of the atmospheric circula- ın over China, the air flow during individual months, the rainfall distribution in relation to mospheric flow, etc. *Subject Headings:* **1. Atmospheric circulation 2. Monsoon circulation Orographic influences 4. China.**—*I.L.D.*

10.6–184 551.513:551.588.2(515)

Yeh, Tu-Chen and Koo, Chen-Chao, **Vliianie Tibetskogo nagor'ia na atmosfernuiu tsirku- ıtsiiu i na pogodu Kitaia.** [Influence of the Tibetan highland on atmospheric circulation and ıather in China.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:127–138, **1956.** 13 s., 17 refs., 10 eqs. **DWB**—The ellipse-like Tibetan Plateau has its long axis approximately st to east so that the westerly air flowing around the plateau in the lower troposphere, rms a northerly and southerly branch. This branching extends to the tropopause. Two rrents are observed at the 220 mb surface between 28° and 29°N lat. and north of 40°N lat. ıese two branches join near Japan to form the strongest jet stream in the Northern Hemi- here. The northern branch produces disturbances under the influence of relief in Sinkiang. ıe southern jet stream is strong and stable; its displacement is restricted by the Plateau ıile the northern branch moves freely. The joining of these two branches hinders the de- lopment of cyclonic activity over all of eastern China; including the northeast. The cyclones ım Central Asia are weakened by the Tibetan Plateau. All lows coming from Europe are ıakened and even stopped near the vicinity of the Tibetan Plateau. On the eastern side a zone calm is formed; here disturbances are rare and wind velocities weak. In the vicinity of the betan Plateau there is present a daily wind variation similar to the breeze circulation along sea asts; by day the wind blows towards the plateau, at night the circulation is reversed. The ateau exerts a marked seasonal influence which is most noticeable during the winter since the summer the zone of westerly transport is displaced northward and the Plateau does t lie within the main zone of westerly flow. *Subject Headings:* **1. Atmospheric circulation Air flow around mountains 3. Topographic influences 4. Tibetan Plateau, S. China.** *I.L.D.*

10.6–185 551.513.1

†Fultz, Dave; Long, Robert R.; Owens, George V. et al., **Studies of thermal convection a rotating cylinder with some implications for large-scale atmospheric motions.** [1956]. p. table, 83 refs., numerous eqs. **DWB** (M13.1 F974st)—The University of Chicago tially started in 1947 experiments on large-scale motion of the atmosphere for the purpose attaining true experimental models of atmospheric, geophysical and possibly astrophysical enomena of a hydrodynamic kind. This paper contains experiments conducted for that rpose. Historical background and theoretical comments are highlighted with dates and ıthematical derivations. A broad survey of a certain class of meteorological experiments ıcludes the work of this paper. It aims at establishing the relevance of meteorological namics as well as meeting the challenge of related problems. Further studies in this field ght lead to an established progress in some neglected area and in providing certain branches meteorology with the fruitful interaction between direct experiment and theory that are ıaracteristic of the older sciences. *Subject Headings:* **1. Thermal convection 2. Atmospheric ıtion 3. Large scale circulation. I. Bohan, Walter II. Kaylor, Robert III. Weil, Joyce.** *N.N.*

10.6–186 551.513.1:551.558.1

Henry, Robert M. and Hess, Seymour L. (*both, Florida State Univ.*), **Study of the large- le spectra of some meteorological parameters.** *Journal of Meteorology*, Boston, 15(4):397–

403, Aug. **1958.** 8 figs., table, 14 refs., 10 eqs. **DWB, DLC**—Methods are developed determining the contribution by each harmonic wave component to the geostrophic kin energy of meridional and zonal motion, and to the geostrophic fluxes of angular moment and enthalpy. Evaluations are carried out for each day of Jan. 1951 for selected latitu and pressure surfaces and the resulting spectral distributions discussed. Salient features large spatial and temporal variations of the energy spectra and unexpectedly large contributi by the lower wave numbers to the fluxes of momentum and heat. *Subject Headings:* **1. G strophic wind computation 2. General circulation energetics 3. Waves in the weste spectra.**—*Authors' abstract.*

10.6–187 551.513.2:551.557.3/5

Dao, Shih-Yen and Chen, Lung-Shun (*both, Inst. of Geophysics and Met., Academy Sin China*), **The structure of general circulation over continent of Asia in summer.** *Meteorolog Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal*, pub. Nov. **1957.** p. 215–2 16 figs., 18 refs. **DWB, DLC**—In this article, an analysis is made on the structure of the m flow field at the 5000, 10,000 and 20,000 ft level in July over the continent of Asia during years 1950–1955 and the mean contours at 200 mb over Asia for July and Aug. 1956. vertical cross sections of the mean flow and temperature fields along 75°E, 90°E, 105°E 120°E for July and Aug., 1956 have been constructed. The three-dimensional structur flow over the continent of Asia is made up of the following three basic currents: (1) the weste of middle latitudes, (2) the upper level tropical and subtropical easterlies, and (3) the so westerly monsoon under the upper level tropical and subtropical easterlies. Moreover, changes of the general circulation over Asia in the transitional period between spring and sum 1956 are also investigated. It is found that a great change of the general circulation Asia occurs during this period. The upper level subtropical westerly jet stream to the sout the Himalayas retreated northward and a subtropical ridge was established over the latit of Tibet, and over south Asia (to the south of 12°N) a high level easterly jet-stream established. At the same time, the southwesterly monsoon of India and the "Meiyu" (p rain) season of the Yangtze Valley set in. The authors also found that the northward placement of the rain belt is closely related to the northward retreat and the accompan weakening in intensity of the westerlies over the China mainland. *Subject Headings:* **1. Gen circulation 2. Upper air wind variations 3. Jet stream 4. Asia.**—*Authors' abstract.*

10.6–188 551.513.2:551.5

Pogosian, Kh. P., **O nekotorykh osobennostiakh struĭnykh techeniĭ v atmosfere.** [S characteristics of jet streams in the atmosphere.] *Akademiia Nauk SSSR. Izvestiia, Geofiz.*, No. 4:515–526, April **1958.** 1 fig., 16 refs., 54 eqs. **DLC.** Trans. available. D (M57.2 P746on)—Data on the vertical and horizontal extension of jet streams and the m mum wind velocities in the system of subtropical and extratropical jets in the North Hemisphere. The radiation conditions of formation of jet streams and their functio relation to the distribution of temperature are examined. The break of the troposphere in system of subtropical jet streams and the position of the jet in relation to the tropopause considered. Data on the temperature distribution in the 0–20 km layer along 45°E presented. *Subject Headings:* **1. Jet stream data 2. Meridional temperature profiles.**—*B on author's summary.*

10.6–189 551.513.2:551

Scorer, R. S.; Forsdyke, A. G. and Davies, T. V., (**Discussion of**) **G. B. Tucker: Evide of a mean meridional circulation in the atmosphere from surface wind observations** (a **Reply by Tucker.** *Royal Meteorological Society, Quarterly Journal*, 84(360):187–188, A **1958. DWB, DLC**—SCORER questions the ignoring of the correlation of wind direction temperature in calculations of mean poleward and equatorward flow around the earth. Tuc replies that the neglect of wind direction introduces an error of <5%. Surface fric differences over land versus sea are discussed by FORSDYKE and DAVIES questions vali of inertia terms near the equator. (For abstract on original, *see* 8.10–143, Oct. 1957, *M. Subject Heading:* **1. Meridional circulation.**—*M.R.*

ATMOSPHERIC DISTURBANCES

See also: **Hurricane rainfall patterns, East Coast, U. S.** (Schoner), 10.6–17; **Hurricanes, U. S.** (Douglas), 10.6–23; **Atmos. stress on sea surface** (Kajiura), 10.6–72; **Typhoon forecast.** (Goodman), 10.6–123; **Radar analysis of rain** (Sal'man), 10.6–125; **Synoptic conditions for instability lines** (Kinoshita), 10.6–148; **Storm surges, L. I., N. Y.** (Kussman), 10.6–154; **Air mass transformation** (Sirotkin), 10.6–175; **Pressure jump and time cross sections, Kansas City, Mo.** (Williams), 10.6–215; **Lapse rate change-thunderstorm relationships, Calcutta** (Gangopadhyaya, Bose), 10.6–221.

10.6–190 551.515(42)

Armour, D. G. (*Met. Off.*), **Storm damage in the early morning of November 4, 1957.** *ather*, London, 12(12):385–386, Dec. **1957. DWB, DLC**—Case history discussion of a rm which produced considerable rain and extensive damage in the south, midland and east tions of England (>1" rain in 24 hrs). Sleet and snow occurred in some places in the dlands and East England and floods occurred in Hampshire, Kent, Surrey and Essex. understorms also occurred. Winds reached 75–95 mph in gusts and 104 mph or more at st Raynham. Roofs were torn off 18 houses in Hatfield New Town and roads and railways re blocked by trees. An Italian steamer went aground on the Isle of Wight. *Subject adings:* **1. Severe storms, England (Nov. 4, 1957) 2. Storm damage 3. England.**—*M.R.*

10.6–191 551.515.5(213)

Ballenzweig, Emanuel M. (*Extended Forecast Section, U. S. W. B., Wash., D. C.*), **Fluctuas in frequency of tropical storms.** *Weatherwise*, Boston, 10(4):121–125, Aug. **1957.** 6 figs., efs. **DWB**—A frequency distribution histogram of tropical storm occurrence in the Atlantic ws peaks at 5–6 a year and at 10 a year—the latter being the maximum frequency of all. eatest number was 21. Other features of the frequency distribution and circulation patterns ociated with high and low frequencies of hurricanes are discussed and illustrated with charts l graphs. *Subject Heading:* **1. Tropical storm frequency data.**—*M.R.*

10.6–192 551.515.5:525.63

Freeman, John C., Jr.; Baer, Ledolph and Jung, Glenn H. (*all, Gulf Consultants*), **The hystrophic storm tide.** *Journal of Marine Research*, New Haven, Conn., 16(1):12–22, **1957.** gs., 4 refs., 23 eqs. **DWB, DLC**—The tides on a regular open coast change rapidly as a rm approaches, and the time history of this change is important in computing dangerously h tides in bays; in addition, this change influences the maximum wave height offshore. iple physical assumptions are used (and justified) to define a "bathystrophic" flow, and it is wn mathematically that this flow is of great importance in the computation of storm tides. ng only the traditionally accepted formulas and constants for wind stress and bottom tion, examples of the time change of the tide have been calculated. These results agree h observations as well as can be expected. Deviations from observations may be due to an e wave. *Subject Headings:* **1. Storm tides 2. Bathystrophic flow.**—*Authors' abstract.*

10.6–193 551.515.5(213)

§Higgs, Ralph L. (*WBAS, San Juan, P. R.*), **Analysis of the squally wave in the Atlantic, 18–19, 1957.** *Monthly Weather Review*, Wash., D. C., 85(7):251–253, July **1957.** 3 figs. **B, DLC**—Synoptic case history and analyzed charts of Caribbean for July 18, 19 and 20, 7 show 200 mb flow and surface analysis, with details of storm that did not quite develop a hurricane. The ICZ was north of its normal position near the Guianas, and 3 waves ned along its 2000 mi extent. The storm threatened the Antilles (Windward Islands) but kened before it did any damage. *Subject Headings:* **1. Tropical wave storms 2. Windward nds.**—*M.R.*

10.6–194 551.515:525.63(438)

Majewski, Aleksander, **Spiętrzenie wód u polskiego wybrzeża spowodowane przejściem onu przez południowy Bałtyk w dniu 17 stycznia 1955 roku.** [The floods on the Polish sts following the passage of the Jan. 17, 1955 cyclone through the southern Baltic.] *Prze- Geofizyczny*, Warsaw, 1(2):117–123, **1956.** 2 figs., 3 tables, map. **DLC**—The passage of

the Jan. 17, 1955 cyclone through the southern Baltic was followed by a tidal wave up to high along the whole Polish coast line. It was only the short duration of the storm that sa the coast from a real disaster. The author describes and illustrates in graphs and tables proceedings at different points of the coast which include: observation of winds on Jan. 16, and 18; the time and values of the highest water levels on Jan. 17, etc. *Subject Headi* **1. Storm surges 2. Storm floods 3. Storm tides 4. Poland.**—*A.M.P.*

10.6–195 551.515:551.55

Ogura, Yoshimitsu (*Johns Hopkins Univ.*), **On the isotropy of large-scale disturban in the upper troposphere.** *Journal of Meteorology*, Boston, 15(4):375–382, Aug. **1958.** 4 fi 25 refs., 12 eqs. **DWB, DLC**—As a preliminary attempt to investigate the applicability of turbulence theory to large-scale atmospheric phenomena, an experimental test is made of isotropy for the large-scale motion of the atmosphere at the 300 mb level. Uses are mad one-dimensional power- and cross-spectra of wind velocities, presented recently by Benton Kahn (1957). The requirement of isotropy seems to be satisfied at lat. 20 N and 70 N, for harmonics whose wave lengths lie between 60° and 20° of long. The latter is the shortest w length analyzed. In the region between lat. 30 N and 60 N, the amount of kinetic energy the north-south component of eddy velocities, in comparison with that in east-west compon is found to be more than that expected from the isotropic relations for the same domain wave number. *Subject Headings:* **1. Isotropic turbulence 2. Large scale eddies 3. T bulence in the upper troposphere.**—*Author's abstract.*

10.6–196 551.515.1:525.63:551.

Tancreto, Anthony E. (*W. B. Office, Boston*), **A method for forecasting the maxim surge at Boston due to extratropical storms.** *Monthly Weather Review*, Wash., D. C., 86 197–200, June **1958.** 3 figs., 9 refs., eq. **DWB, DLC**—An empirical relationship betw computed significant wave height and height of extratropical storm surge at Boston is fou The relationship is expressed as a linear regression equation for forecasting surge height fi significant wave height as computed from the Bretschneider graph. *Subject Headings:* **1. St surge forecasting 2. Wave heights 3. Extratropical cyclones 4. Boston, Mass.**—*Auth abstract.*

10.6–197 551.515:551.576.11:551.

Venkateswara Rao, D. and Marik, R. H. (*both, Met. Off., Barrackpore*), **Cloud d antecedent to nor'westers at Calcutta.** *Indian Journal of Meteorology and Geophysics*, D 7(1):84, Jan. **1956.** table. **DWB, DLC**—A table shows the drift of medium height cl during a severe period of northwesters at Calcutta 1–15 May 1953. The time between app ance of Ac clouds and the northwester onset varied from 1 hr 26 min to 3 hrs and 25 m Data are tabulated. Highest winds were 62 kn on 2nd and 87 kn on 9th. *Subject Headi* **1. Northwesters 2. Cloud drift preceding northwesters 3. Calcutta, India.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Solar energy utilization,** 10.6–1; **Čerenkov radiation** (Jelley), 10.6–7; **Light intensity and nocturnal temp.** (Bensink), 10.6–100; **Solar energy utilization** (Ismailova), 10.6–112; **Heat and radiation balance** (Anido Artiles), 10.6–178; **Temp.-height relationships, Eng.** (Lawrence), 10.6–206; **Takata reaction and solar eclipse, June 30, 1954, Suwałki, Poland** (Kocyan et al.), 10.6–307; **Visibility in fog** (Olivier), 10.6–311; **Ultraviolet radiation** (Sekihara), 10.6–315.

10.6–198 551.5

Rank, D. H.; Saksena, G. D. and McCubbin, T. K., Jr. (*all, Penn State Univ. Pen* **Measurements of the dispersion of air from 3651 to 15,300 angstroms.** *Optical Societ America, Journal*, 48(7):455–458, July **1958.** 3 figs., 2 tables, 5 refs., eqs. **DWB, DL** The difference between the index of refraction for green mercury light and for 7 other mer

ission wave lengths from 15,300 Å to 3651 Å has been measured using a Twyman-Green terferometer as a refractometer. A photoelectric method was used for the infrared de-rmination. A method depending upon photography of interference fringes which were used to appear crossing the lines in the mercury spectrum was used for the visible and traviolet measurements. The mean observed deviation of the measurements of $(\mu-1)$ om the predictions of the Edlén formula was 1 part in 10^6. *Subject Headings:* **1. Optical fraction in air 2. Atmospheric scattering.**—*Authors' abstract.*

10.6–199 551.501.4:551.521.3

Sato, T. (*Nagasaki Univ.*), **On the polarization angle in the scattering problem.** *Meteorological Society of Japan, Tokyo Journal*, Ser. 2, 34(2):51–80, May, **1956.** 6 figs., 2 tables, refs., 120 eqs. **DWB, DLC**—Detailed mathematical treatment of the problem of the polarization angle of secondary scattering of solar radiation in the atmosphere. First, the basic eory of primary and secondary scattering are treated, then the method of calculation of the larization angle is developed, followed by the detailed treatment of the mathematical aracteristic of the polarization angle for particular values of A, of h and the mutual relations tween the angles for values of A. Finally, very extensive tables are given for various values combinations of θ, α/h, A_1/θ_1, A, D, and α. *Subject Headings:* **1. Polarization angle of condary scattering 2. Polarization tables.**—*M.R.*

10.6–200 551.521.32:535.33:546.33

Cooper, C. Dewey (*Physics Dept. Univ. of Georgia, Athens*); Manring, Edward R. and ndinger, John F. (*both, Air Force Research Center, Bedford, Mass.*), **3303 A emission from dium ejected into the upper atmosphere.** *Journal of Geophysical Research*, Wash., D. C., (2):369–371, June **1958.** 7 refs. **DLC**—The emission of both 5893 Å and 3303 Å has been served from a sodium cloud in the upper atmosphere. The yellow line is at least 100 times re intense than the ultraviolet line. The appearance of the 3303 Å line with the observed ensity proves conclusively that the sodium twilight flash results from resonance scattering. *bject Headings:* **1. Sodium emission 2. Twilight luminescence.**—*Authors' abstract.*

10.6–201 551.521.32:551.521.18:551.511.33

Roach, W. T. and Goody, R. M. (*both, Imperial College, London*), **Absorption and emission the atmospheric window from 770 to 1250 cm^{-1}.** *Royal Meteorological Society, Quarterly urnal*, 84(362):319–333, Oct. **1958.** 6 figs., 7 tables, 38 refs., 11 eqs. **DWB, DLC**—Comed absorption and emission spectra have been recorded in the atmospheric window from 0 to 1250 cm^{-1} both in London and in the relatively clean air of Ascot, Berks. The absorpn spectra have been partially analyzed in terms of selective and continuous extinction. e continuous extinction outweighs the selective in both Ascot and London. There is good reement between the observed selective absorption and existing theoretical and laboratory ta upon gases known to be present in the atmosphere. The opacity of the continuum shows increase towards low frequency, and it is much greater in London than in Ascot; in both ces it is positively correlated with water vapor. The average effective emission temperature the continuum is not significantly different from that of water vapor. The only hypothesis ich seems to fit all the observations is that in London the continuum extinction is largely ised by aerosol extinction while in Ascot this is only of minor importance. This requires at the extinction at Ascot be caused by wings of distant lines; this old suggestion of ELSASSER re-examined and found to be plausible. Attention is drawn to the important contribution ich the continuum can make to the heat balance of the atmosphere below 2 km. *Subject adings:* **1. Atmospheric absorption-emission spectra 2. Heat balance of atmosphere Ascot, Eng. 4. London, Eng.**—*Authors' abstract.*

10.6–202 551.521.326 551.594.51:551.590.21

†Bagariatskiĭ, B. A., **Raboty sovetskikh uchenykh po svetimosti nochnogo neba i poliarnykh nii.** [The work of Soviet scientists on the night airglow and the polar auroras.] *Akaiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 11:1410–1417, **1957.** 118 refs. **DWB**—viet research on night airglow, twilight luminescence of the atmosphere and auroras during past forty years is reviewed. In the 1920's, FESENKOV developed the method of "twilight

photometry"; VUKS and CHERNIAEV in 1937 observed the fluorescence of the atmosphere the form of sodium flashes. The role of repeated scattering in twilight phenomena, twilight flash of oxygen lines and the explanation of the latter by the selective refraction solar radiation in the atmosphere constitute some of the lines of study of twilight phenome The study of the glow of the night sky includes the development of new apparatus, resea on the ultraviolet region, etc. After World War II, V. I. KRASOVSKII investigated the infra emission of the night sky and the mechanism of disturbance of hydroxyl glow. The ene distribution of the night sky was investigated with the aid of electrophotometers and li filters. In 1950–1952 the Institute of Terrestrial Magnetism organized in Murmansk first station for auroral studies under the direction of S. I. ISAEV. Two other stations h been established to study the relationship of auroras to solar activity. The theory of interrelationship of solar corpuscular flux to the atmosphere and magnetic pole of the ea has been investigated by Z. I. LEBEDINSKI and others. *Subject Headings:* **1. Night airg 2. Twilight luminescence 3. Auroral-solar relationships.**—*I.L.D.*

10.6–203 551.521.326:535.33:537.52:54

Barth, Charles A., **Laboratory spectroscopic study in chemical aeronomy.** Califor Univ. Institute of Geophysics, Contract AF 19(122)-453, Final Report, June 30, **1957.** 3 16 figs. (incl. photos), 20 refs., 32 eqs. **DWB** (M21.4 C153s)—A report on laboratory stu and of equipment for spectroscopic investigations of the nitrogen, the oxygen and nitrog oxygen afterglows, with a discussion of N-O reactions in the upper atmosphere, the ni airglow spectrum and reactions, and other recommended studies of these phenomena an the chemical processes in the upper atmosphere. New nitric oxide bands β were discovered blue N-O afterglow, showing the dissociation energy of NO to be 6.50 ev and of N_2 to be 9.76 New infrared bands of nitric oxide were also found in the blue afterglow and Herzberg oxy bands in green air afterglow. *Subject Headings:* **1. Chemical aeronomy 2. Nitrogen-oxy afterglows 3. Night airglow spectroscopy. I. Schade, William J.**—*M.R.*

10.6–204 551.521.326:551.59

Meinel, A. B. (*Natl. Astron. Obs. & Yerkes Obs., Williams Bay, Wis.*), **Airglow and aur** *Smithsonian Contributions to Astrophysics*, Wash., D. C., 1(1):95–97, **1956.** 8 refs. **DW DLC**—ÅNGSTRÖM first observed and measured the wave length of the green auroral lin 1867. Since then many observers have been making remarkable auroral observation order to determine the light of the night sky and the auroras. This paper describes the app ance of the light of the night sky on the spectrum of a faint astronomical object, in the diffe spectral regions. The characteristics of λλ4800–3100 spectrum, the region <λ3500, airg spectrum λλ6500–4200 are also discussed. It is hoped that more data on airglow and aur will be collected during IGY. *Subject Headings:* **1. Night airglow 2. Auroras.**—*N.N.*

TEMPERATURE

See also: **Temp. variations, Resolute, N.W.T.** (Longley), 10.6–37; **Cold poles, Amundsen-Scott Station and Verkhoyansk** (Levert), 10.6–41; **Light intensity and nocturnal temp.** (Bensink), 10.6–100; **Temp. effects on plant growth** (Shigolev), 10.6–104; **Low temp. effects on stored apples** (Smith), 10.6–111; **Hydrodynamic temp. computation** (Kurbatkin), 10.6–147; **Heat diffusion equations** (Haltiner), 10.6–180; **Diurnal temp. variations** (Masalova), 10.6–181; **Turbulence structure** (Adey, Heikkila), 10.6–220; **Gorge effects on wind and temp., St. Lawrence River Mouth** (Munn), 10.6–234; **Convection above heated ground** (Croft), 10.6–241.

10.6–205 551.524:551.526.6:551.511.32(261/

Walden, Hans, **Temperaturbeobachtungen auf den Segelschiffen "Passat" und "Pa und Folgerungen für die Berechnung des Wärmehaushaltes Ozean-Atmosphäre.** [T perature observations on the sailing ships "Passat" and "Pamir" and conclusions on calculation of the heat exchange between ocean and atmosphere.] *Annalen der Meteorol* 5(7–12):303–312, **1952.** 6 figs., 2 tables, 11 refs. Discussion p. 311–312. **DWB** voyages to South America, observations were made in screen on charthouse wall and Assmann psychrometer to windward of ship. Diurnal variations of temperature and humi

fferences under various conditions of sun and shade, and of wind relative to ship (screen ntilation) are shown. At noon screen dry bulb averages 1.6°C and wet bulb 1.4°C too high. onsequences for heat balance calculations are discussed. *Subject Headings:* **1. Temperature easurements 2. Heat exchange sea-atmosphere 3. Atlantic.**—*C.E.P.B.*

10.6–206 551.524.2:551.521.1:551.588.2(420)

Lawrence, E. N., **Temperatures and topography on radiation nights.** *Meteorological agazine*, London, 87(1029):71–75, March **1958.** 6 figs. (incl. photos p. 80), table, 4 refs. **WB**—It is shown that a relation exists between topography and meteorological elements. he present investigation covers three hill areas in England. The report shows the topographic ntours of the area and the graphical and tabulated representation of height related to early orning temperature for May, 1955, and particularly on radiation nights. In general (with few exceptions) there was a temperature response to any change of height. *Subject Headings:* **Temperature-height relationships 2. Topographic influences 3. Radiational cooling England.**—*N.N.*

10.6–207 551.524.33:551.510.535(73)

Visser, S. W., **The 27-day period in United States temperatures.** *American Geophysical nion, Transactions*, 39(5):835–844, Oct. **1958.** 9 figs., 2 tables, 8 refs., eq. **DWB, DLC**—he daily maximum temperature observations in the U. S. during two series of regular 27-day riods in the years 1947 and 1953 are harmonically analyzed. The amplitude being sta-stically insufficient, the reduced amplitude, that is amplitude divided by standard deviation, introduced. The results arrived at are compared with those in Europe. The investigation scloses the intermediate action of the ionosphere, especially that of the magnetic storms in e F2 layer. *Subject Headings:* **1. Temperature periodicities 2. Ionospheric effects on rface temperature 3. United States.**—*Author's abstract.*

10.6–208 551.524.36(54)

*Doraiswamy Iyer, V. (*Bangalore*), **High maximum temperatures on the North Konkan ast.** *Indian Journal of Meteorology and Geophysics*, Delhi, 9(3):259–266, July **1958.** 6 figs., tables, 2 refs. **DWB, DLC**—A study of spells of hot weather during summer over the city Bombay (Colaba) for the period 1878–1955 has been reported to NATARAKAN (*see* 8.10–167, ct. 1957, *MAB*). The present study carried out some time before the study reported by ATARAKAN related to the occurrence of hot spells over the north Konkan coast represented Colaba, Alibag and Ratnagiri during the premonsoon as well as the postmonsoon period. n the north Konkan coast, the maximum temperature exhibits two peaks, one before the set of the southwest monsoon and the other after the end of the monsoon. The clearing the skies after the cessation of the rains leads to a rise of day temperature, which begins to ll again only with the approach of the winter. The second maximum after the monsoon curs in Oct.–Nov. both in the mean daily as well as in the mean monthly maximum tem-rature. It is interesting, however, to note that the principal premonsoon maximum of the ean monthly maximum temperature as well as the highest temperature of the year are both corded usually in March and not in May. In marked contrast to this, the annual march the maximum temperature along the north coastal Andhra Pradesh exhibits only a single ak in May–June, both in the mean daily maximum temperature as well as in the mean onthly maximum temperature. The highest maximum temperature of the year is also corded in May or June. This is a result of the dry hot westerly winds which blow across the rth of the Peninsula in this season. The continuation of rains in Oct.–Nov. (the retreating onsoon rains), prevents any rise of temperature after the end of the southwest monsoon oper. *Subject Headings:* **1. Hot spells 2. Maximum temperatures 3. North Konkan ast, India.**—*Author's abstract.*

10.6–209 551.524.36:697.13(52)

Kubo, J., **On the heating duration and degree-day in Japan.** *Japan. Meteorological gency, Tokyo, Memoirs of Industrial Meteorology*, 20(3):23–29, **1957.** 8 figs., 5 refs. In panese; English summary p. 29. **DLC**—Various reports have been published on the heating

degree-day in Japan. In this paper, the author has selected the indoor air temperature 14°C as the low limit of comfortable temperature, and outdoor temperature of 10°C as. t limit temperature for heating. On the basis of these temperatures, the author has calculat the heating duration and heating degree-day, making use of the annual change of mean temperature at 140 places in Japan, and the distribution of heating duration and degree-d in Japan is shown (Fig. 3). Next, the author shows the relation between the monthly me air temperature of Jan. and the heating duration and degree-day (Figs. 4, 5 and 6). Last the author shows the diagrams to determine the heating duration and degree-day for optio values of indoor air temperature and limit temperature (Figs. 7 and 8). *Subject Headin* **1. Heating degree days 2. Degree-day data 3. Japan.**—*Author's abstract.*

10.6–210 551.524.4:551.510.42:628

Smith, M. E.; Singer, I. A.; Bartlett, F. E. and Marcus, L. (*all, Brookhaven Natl. La Upton, N. Y.*), **The variation of effluent concentrations during temperature inversions.** *Pollution Control Association, Journal*, 7(3):194–197, Nov. **1957.** 3 figs., 2 tables, 6 refs., 2 e **DWB, DLC**—The first section of this paper is a review of some previous studies made on t subject and the facilities provided by the Brookhaven meteorological installation for vary the effluent concentrations during temperature inversions. The second section is on t sampling and analysis procedures to be adopted. The Brookhaven data reveal that diffus within the first mile from the source agrees with the pattern suggested by BARAD, in which initial aerodynamic diffusion process is followed by a very gradual, natural one. The mark 2-stage nature of the plume behavior makes the accurate prediction of the inversion diffus concentrations difficult. *Subject Headings:* **1. Diffusion of gases 2. Inversion effects on sta effluents 3. Atmospheric pollution.**—*N.N.*

UPPER AIR TEMPERATURE

See also: **High alt. radiosonde flights, Greenland** (Lowenthal), 10.6–19.

10.6–211 551.524.7(547

*Srinivasan, P. K. (*Met. Office, Poona*), **Ground inversions over Poona during the mon October to December.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(2):246–2 April **1957.** 4 tables, 4 refs. **DWB, DLC**—A table gives the frequency of ground inversi and isothermal layers over Poona for 3 months (Oct.–Dec., 1948) based on 112 morn radiosonde ascents. The probability of a ground inversion in Oct. and Nov. is almost 5 and in Dec. 100%. Data on the thickness of the inversion layer, the inverse lapse rates (mea extremes, medians and standard deviation) and the mean fall in specific humidity throu the inversion layer are also tabulated and discussed. *Subject Headings:* **1. Inversion f quencies 2. Tropospheric propagation micrometeorological data 3. Poona, India.**—*M.R.*

SOIL TEMPERATURE

10.6–212 551.525(7

*§Fluker, B. J. (*Texas Eng. Experiment Station*), **Soil temperatures.** *Soil Science*, Baltim 86(1):35–46, July **1958.** 13 figs., 3 tables, 24 refs., 6 eqs. **DLC**—This paper presents res of the measurement of natural soil temperatures under a bare ground surface at College Stat Tex., during the years 1951 through 1955, inclusive. Temperature data are given for air for nine different depths from the ground surface to a maximum depth of 10 ft. A gen equation is developed to describe the annual temperature variation observed at each dep A discussion of the soil temperature gradients and of the effects of rainfall and resulting moisture content changes are included. *Subject Headings:* **1. Soil temperatures 2. Coll Station, Tex.**—*Author's abstract.*

10.6–213 551.525:551.578

Lappo, T. I., **Metod rascheta temperatury pochvy pod snezhnym pokrovom.** [Met of calculating soil temperature under a snow cover.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 71:229–237, **1957.** 9 refs., 28 eqs. **DWB** (M(055) U581tG)—

uthor investigates the equation of heat conduction in the complex medium snow-soil in nnection with the calculation of the temperature of soil under a snow cover with hetero-ncous thermal properties. This problem is reduced to the solution of a system of partial fferential equations with variable coefficients under nonuniform initial conditions. Theo-tical formulas for determining the functions of temperature distribution in snow and in soil nder a snow cover under uniform and nonuniform initial conditions are derived. These rmulas are simplified for practical calculation and the values of the various parameters are lculated. The formulas for calculating the thermal regime of soil under snow obtained by king into account the effect of variation of density with depth are compared with the solutions r a constant snow density. *Subject Headings:* **1. Soil temperature under snow 2. Soil mperature calculations.**—*I.L.D.*

WATER TEMPERATURE

See also: **Ice accumulation-temp. relationships, Greenland** (Loewe), 10.6–36.

10.6–214 551.526.6/8(52)

*Takahashi, Tadao, **A physical treatment on the accumulated materials of the annual mperature variation in lakes and ocean.** *Kagoshima, Japan. Univ. Faculty of Fisheries, lemoirs*, 6:47–76, March **1958.** 7 figs., 15 tables, 11 refs., 3 eqs. **DWB.** Reprinted in *yoto. Univ. Meteorological Research Institute, Meteorological Notes*, Ser. 2, No. 13, **1958.** WB—A practical procedure based on NAMEKAWA's theory which ingeniously takes into nsideration the upward heat flux in the cooling stage. The amount of annual heat exchange nd annual mean eddy thermal diffusivity are calculated by this procedure from the annual ariation of water temperature in 17 lakes and 113 stations in the sea around Japan. Their ertical and geographical distributions are discussed. *Subject Headings:* **1. Lake temperature ariations 2. Ocean temperature variations 3. Japan.**—*Author's abstract.*

PRESSURE AND WIND

PRESSURE

See also: **Statistical analysis of pressure data, Brno-Pisarky, Czech.** (Hodinková), 10.6–132; **Short range forecast. res.** (Just et al.), 10.6–151; **Baric topograph charts and altimeters** (Butorin), 10.6–153; **Sea level pressure forecast.** (White et al.), 10.6–155; **Diurnal temp. variations** (Masalova), 10.6–181.

10.6–215 551.543.5:551.515.8(778)

Williams, Dansy T. (*Severe Local Storms Center, U. S. W. B., Kansas City, Mo.*), **Case study f the passage of a pressure jump line using time cross sections of hourly rawindsonde ob-ervations.** Aug. 13, **1957** (rev. Sept. 16, 1957). 7 p. 16 figs., 4 refs. Reproduction of pescript. **DWB** (M41 U587ca)—Hourly rawindsonde observations are used to construct me cross sections of various parameters during the passage of a pressure jump line at Topeka, an., on June 17, 1957. Time cross sections of horizontal temperature advection, potential mperature, vertical motion, relative humidity, wind direction, and wind speed are shown to ear certain relationships to the passage of the pressure jump line at the station. *Subject eadings:* **1. Pressure jump 2. Rawinsonde data 3. Time cross sections 4. Mesoanalysis Kansas City, Mo.**—*Author's abstract.*

10.6–216 551.542:551.552

Schaffer, W. (*Physics Dept. Univ. of Cape Town*), **Pressure gradient associated with eeply inclined air-flow.** *Royal Society of South Africa, Cape Town, Transactions*, 32(2):205–6, (1950?). 2 figs., 5 refs., 9 eqs. **DWB** (M4 S296pr), **DLC**—Steeply inclined air flow, ich as the flow over an escarpment, is of great importance in meteorology. The horizontal ressure field associated with such flow is investigated, and three components, associated spectively with hydrostatic effects, with accelerations and with friction, are evaluated. A ggestion for the relation between the hydrostatic and the accelerational components is given.

The upper level pressure gradient in the direction of flow is thus calculable from a simp formula, involving the height of the escarpment (or other obstacle), the lapse rate of the and the temperature. Application of the theory to practical forecasting is briefly discusse *Subject Headings:* **1. Orographic effects on pressure 2. Air flow over mountains 3. Pressu effects of mountain waves.**—*Author's abstract.*

10.6–217 551.542:551.583.

Shapiro, Ralph (*GRD, A.F. Camb. Res. Center*), **Some observations of the persisten of the surface pressure distribution.** *Journal of Meteorology*, Boston, 15(5):435–439, O **1958.** 6 figs., 4 tables, 3 refs. **DWB, DLC**—Observations of the persistence of the surfa pressure distribution are compared for two regions of the Northern Hemisphere. One reg covers most of North America; the other region is comparable in size and is centered on t Greenwich meridian. The linear correlation coefficient is used as a quantitative measure persistence. The European pressure distribution is found to have considerably grea persistence up to periods of three days. Comparison of the monthly means of the persiste observations and crude measures of the vertical wind shear indicate that the atmosph behaves in a manner which is consistent with the conclusions of theoretical studies on t growth of atmospheric disturbances. *Subject Headings:* **1. Surface pressure distribut 2. Persistence 3. Northern Hemisphere pressure.**—*Author's abstract.*

10.6–218 551.54

Huzimura, I. (*Mt. Fuji Met. Obs., Japan*), **Diurnal change in barometric pressure.** *M teorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal*, pub. Nov. **1957.** p. 1 159. 2 figs., 5 eqs. **DWB, DLC**—As the cause of the diurnal change in barometric pressu the author proposes two elementary changes: the thermal effect Δp and the dynamical eff $\Delta\pi$, i.e. $dp(\tau)=\Delta p(\tau)+\Delta\pi(\tau)$. Here, $dp(\tau)$ is the diurnal variation in barometric pressure a

$$\Delta P=c\cdot\frac{\partial^2\theta(\tau)}{\partial\tau^2}=2cB\theta_0\{2B(\tau-13)^2-1\}e^{-B(\tau-13)^2}$$

$$\Delta\pi=\tilde{c}\cdot\Delta Ph=\tilde{c}\cdot\{pu\{u_0e^{-r(\tau-3)^2}+\tilde{u}-u\}\}_h$$

where c, B, r and $\tilde{c}$, $\tilde{u}$ are all constants; θ_0 and u_0 the diurnal ranges of air temperature a upper wind speed, respectively; p and u the mean density and mean wind speed in upper layer, respectively; e the Napier constant and τ the local time. *Subject Heading:* **1. Diur pressure variations.**—*Author's abstract.*

10.6–219 551.547.1:551.509.

Höiland, E. and Pedersen, Kåre, **On persistency in the monthly mean thickness 500/1 mb north of 47,5° latitude.** *Norske Videnskaps-Akademi i Oslo. Institutt for Vaer- og Kli forskning, Report*, No. 1, **1956/1957.** 10 p. 7 tables, 3 refs., eqs. **DWB** (M(055) M863p The anomalies in monthly mean thickness 500/1000 mb averaged over certain geograph regions are statistically investigated. For March, April, June, August, Oct. and Nov significant persistency is found from one month to the next in the anomalies over the c tinental eastern part of the Northern Hemisphere north of 47.5° lat. Over the Atla Ocean north of 47.5° latitude no persistency is found. These facts indicate that the persiste in great part is due to radiational factors of which two are discussed. *Subject Headi* **1. Thickness anomalies 2. Thickness charts (500–1000 mb) 3. Persistence.**—*Auth abstract.*

GUSTINESS AND TURBULENCE

See also: **Airplane turbulence obs.** (Pinus), 10.6–98; **Vertical wind velocity meas.** (Shur), 10.6–136; **Turbulent transfer of energy** (Ogura), 10.6–177; **Isotropic turbulence** (Ogura), 10.6–195.

10.6–220 551.551.25:551.5

Adey, A. W. and Heikkila, W. J. (*both, Defence Res. Telecommunications Establishm Ottawa*), **Measurements of fluctuations of atmospheric temperature.** *Canadian Journa*

Physics, Ottawa, 36(6):802–804, June 1958. 3 figs., table, 2 refs. **DWB, DLC**—Much information about the structure of atmospheric turbulence can be obtained through measurements of fluctuations of temperature. This has been investigated recently for the lowest few hundred feet of the atmosphere by KRECHMER (**1952**; *see* 4B–312, Feb. 1953, *MAB*) and MACCREADY (**1953**; *see* 5.3–84, March 1954, *MAB*. However, in these and most other cases the scope of the work was more or less restricted by one or more of the following equipment characteristics: sensitivity and time constant, the physical size of the sensing elements and, in those studies which involved the measurement of the spectrum of the fluctuations, the frequency range of the spectrum analyzer. In the study initiated at this laboratory, it is felt that all of these restrictions have been relaxed to some extent. *Subject Headings:* **1. Turbulence structure 2. Temperature fluctuations.**—*Authors' abstract.*

10.6–221 551.551.5:551.509.327:551.515.4(540)

*Gangopadhyaya, M. and Bose, B. L. (*both, Met. Office, Calcutta*), **Lapse rate change due to advection at lower levels and occurrence of pre-monsoon thunderstorms.** *Indian Journal of Meteorology and Geophysics*, 9(2):137–144, April **1958.** 3 figs., 2 tables, 3 refs., 7 eqs. **DWB, DLC**—Using the method of vertical wind shear vector difference, the change in lapse rate brought about by advection alone (up to a height of 5000–7000 ft) was estimated for Calcutta from the upper wind data of 0200 GMT ascent for every day, spread over a period of one month of the usual peak activity of northwesters (violent thunderstorms). This change applied to the morning tephigram is found to provide a moderately successful tool for prediction of local afternoon thunderstorms. The percentage of success for the period studied is nearly 80%. *Subject Headings:* **1. Thunderstorm forecasting 2. Lapse rate change-thunderstorm relationships 3. Advective change of lapse rate 4. Calcutta, India.**—*Authors' abstract.*

10.6–222 551.551.5(52)

Kikuchi, T.; Watanabe, R. and Kikuchi, S., **On the turbulence along the air line of Chitose to Haneda.** *Journal of Meteorological Research*, Tokyo, 8(12):786–788, Jan. **1957.** 0 figs. In Japanese. **DWB, DLC**—Light, moderate and severe type turbulences observed by air line pilots from Chitose to Haneda (Tokyo) during May, 1956, are analyzed. Discussion on pressure patterns, air current movements and type of cloud in several incidents are given with pressure charts. *Subject Headings:* **1. Clear air turbulence 2. Japan.**—*J. Woo.*

WIND DISTRIBUTION AND WIND VARIATION

See also: **Wind power projects, Saurashtra, India** (Bhatt), 10.6–115; **Graphical interpolation of wind isotach** (Fea), 10.6–121; **Horizontal wind divergence nomograms** (Mertsalov), 10.6–122; **Atmos. and monsoon circulation, China** (Vitvitskiĭ), 10.6–183; **Meridonal circulation** (Scorer et al.), 10.6–189; **Orographic effects on pressure** (Schaffer), 10.6–216; **Cloud particle sizes, Khandala, India** (Biswas, Srivastava), 10.6–254; **Ionization during breezes** (Kotsev), 10.6–319.

10.6–223 551.552:551.591:551.575(73)

*Smalley, Clarence L. (*U. S. W. B., S. Francisco Int. Airport*), **Survey of air flow patterns in the San Francisco Bay Area, California: preliminary report, March 1, 1957.** 16 p. 9 figs., tables. **DWB** (M52 U587sp). Also his: **Final report, March 1, 1957 1957.** 16 p. 9 figs., tables. **DWB** (M52 U587su)—Wind flow data from 33 points in the San Francisco Bay area for 1952–55 are analyzed to show diurnal and monthly patterns over the irregular topography of this region. Charts were made each 6 hrs and analyzed by 40 prevailing types of flow (three or more types from each major direction, e.g., N, NE, E, SE, . . . NW). Frequency of each type each season and at different times of the day is shown statistically. Wind speed and lapse rate are not considered. A comparison of fog (6 mi visibility or less) and circulation patterns, noted as light variable by months, are shown graphically for Oakland airport. *Subject Headings:* **1. Air flow types 2. Poor visibility 3. San Francisco Bay area, Calif.**—*M.R.*

10.6–224 551.553.21:551.589.5(5)

Flohn, H., **Large scale aspects of the "summer monsoon" in south and east Asia.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal*, pub. Nov. **1957.**

p. 180–186. 5 figs., 23 refs. **DWB, DLC**—In classical textbooks of climatology the annu course of weather and climate is largely described by means of monthly averages and fr quencies. In some areas of Japan this leads to considerable smoothing of the two domina rain-periods found in early and late summer, separated by a dry season starting near mi July. Although J. J. REIN mentioned this threefold structure of summer weather in Japa as early as 1876, and although the late T. OKADA thoroughly described the Baiu-season (1 with its westerly disturbances, the fiction was widely accepted of a single rain period duri the whole summer connected with a south-easterly "monsoon flow" from the Pacific. Fro the geographical viewpoint, the climate, landscape and economy of southern and eastern As ("Monsoon Asia") were not infrequently considered as dominated by the summerly inflo of maritime moist air with rain. However, since 1930 the aerological observations ha revealed a far more differentiated picture of the upper air currents. This is well-known amo meteorologists of eastern Asia, even if large gaps in the available aerological information st are to be filled. The purpose of this contribution is to draw attention to some peculiar lar scale teleconnections, i.e., space- and time- correlations connected with the occurrence of t early summer rainy season in eastern and southern Asia. *Subject Headings:* **1. Synop climatology 2. Monsoon circulation theories 3. Asia.**—*Author's abstract.*

10.6–225 551.553.5:551.553

Bol'shakov, V. S., **Maksimal'noe uskorenie vetra pri shkvalakh.** [Maximum wi acceleration in squalls.] *Meteorologiia i Gidrologiia*, No. 9:32–33, Sept. **1956.** fig., 2 re **DWB, DLC.** Trans. into English available for reference, U. S. Weather Bureau Libra (M53.8 B6937). Typescript. 3 p. fig., 2 refs.—The determination of maximum wi acceleration is based upon observations on all wind acceleration greater than 0.5 m/sec minimu recorded at the Odessa Geophysical Observatory. The maximum wind velocities were fr 5 m to 10 m/sec. An empirical equation between maximum acceleration and maximum wi velocity is presented, namely:

$$\mu = 0.66e^{0.14'v}$$

where μ = maximum wind acceleration and v = maximum wind velocity in m/sec. A gra giving the $\mu = °f(v)$ is presented. The same minimum velocity can correspond to differe maximum accelerations from magnitudes slightly above zero to maximum values establish with the above formula. *Subject Headings:* **1. Maximum wind acceleration 2. Maximu wind speed 3. Squalls 4. Odessa Geophysical Observatory.**—*I.L.D.*

10.6–226 551.55

Imakado, M., **On the velocity of gusty wind.** *Journal of Meteorological Research*, Toky 8(1):46, March **1956.** 2 refs., 6 eqs. In Japanese. **DWB, DLC**—Assuming gusty wind i composite form of three different types of wind, equations of the three winds are given w conditions. The value obtained by trial substitution in the equations was somewhat close observed maximum wind speed of gusty wind. *Subject Heading:* **1. Gust velocities.**—*J. W*

10.6–227 551.553.8(

Iastrebov, E. V., **Sil'nyĭ shkval v Severnom Priural'e.** [Strong squall in the north Ural region.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:30–32, **1958.** 3 figs. **DW DLC**—On May 23, 1957, a strong squall of unusual intensity occurred in the northern Ura causing wide destruction. The weather of the first half of this day was normal for this regi being characterized by a southwest wind, gradually rising temperature 12°–14°C at 0 o'clock to 20°–22°C at 1300 o'clock, relative humidity 55–60%, etc. At 1500 o'clock weather changed suddenly; the wind shifted to northwest. The squall continued from 1 to 1600 o'clock. The wind velocity was 20–25 m/sec and occasional gusts of 30–40 m/s The atmospheric pressure fluctuated sharply and the temperature dropped by more th 10°C, and the relative humidity rose to 100%. The synoptic situation over the Urals a adjoining areas and the extent of the destruction are described. *Subject Headings:* **1. Squa 2. Synoptic conditions for squalls 3. Northern Urals, U.S.S.R.**—*I.L.D.*

VERTICAL WIND DISTRIBUTION

10.6–228 551.554:551.557.2

Dmitriev, A. A., **O vozmozhnom ob"iasnenii nekotorykh osobennosteĭ izmerennogo nad okeanom raspredeleniia vetra s vysotoĭ.** [Possible explanation of some measured characteristics of the vertical wind distribution over an ocean.] *Akademiia Nauk SSSR. Morskoĭ Gidrofizicheskiĭ Institut, Trudy*, 8:109–112, **1956.** 3 refs., 18 eqs. **DLC**—Theoretical explanation of a phenomenon described by D. R. JONES in his **Note on observed vertical wind shear at low levels over the ocean,** published in *AMS, Bull.*, 34(9):393–396, Nov. **1953** (*see* 5.8–169, Aug. 1954, *MAB*), in which JONES indicates the presence of a decrease of measured vertical wind speeds at about 15 m, 300 m and 600 m over the sea. The number of such cases amounted to 50–60% of the total number of observations, and the cause of the phenomenon remained unexplained by JONES. The author's explanation of the overestimation of apparent speeds, when using inertia wind, has been confirmed recently in A. M. IAGLOM's paper. *Subject Headings:* **1. Wind profile above sea 2. Vertical wind shear.**—*A.M.P.*

10.6–229 551.554:623.451.8

Dvoskin, Norman and Sissenwine, Norman, **Evaluation of AN/GMD-2 wind shear data for development of missile design criteria.** *U. S. Air Force, Cambridge Research Center, Air Force Surveys in Geophysics*, No. 99, April **1958.** 72 p. 11 figs., tables, 16 refs. **DWB, DLC**—Vertical wind shear data obtained from forty-nine AN/GMD-2 soundings performed at L. G. Hanscom Field, Bedford, Mass., and Grenier Air Force Base, N. H., are analyzed. Brief descriptions of the AN/GMD-1 and AN/GMD-2 sounding equipment are presented, and the increased accuracy in measuring wind speeds and derived shears with the new AN/GMD-2 equipment is discussed. The possibility of measuring winds averaged through a 1-min. time interval with the new equipment rather than the conventional 2-min. interval is also investigated. Wind shears observed through 1000-, 3000-, and 5000-ft thicknesses are considered, and the relationship of these shears to the wind speed and height is studied. An attempt is made to present the derived wind shear data in a form suitable for direct missile design applications. This consists of frequency tabulations and percent occurrence of 1000-, 3000-, and 5000-ft shears as well as the 1% occurrence shears at the level of strongest wind. *Subject Headings:* **1. Vertical wind shear 2. Missile design 3. Wind speed recorders.**—*Authors' abstract.*

10.6–230 551.554(263)

Wagner, N. K., **An analysis of some over-water wind profile measurements.** *American Geophysical Union, Transactions*, 39(5):845–852, Oct. **1958.** 8 figs., 3 tables, 15 refs., 14 eqs. **DWB, DLC**—For several days during the spring of 1955, wind-speed profiles were measured from an oil drilling platform in the Gulf of Mexico. Various standard parameters such as the friction velocity, roughness parameter, surface stress, and resistance coefficient are computed from these profiles. Functional relationships are derived between the various computed parameters and the wind speed at ten meters. A re-analysis of data obtained by WUST in 1919 shows that it is in very good agreement with the present data. An attempt is made to relate the roughness parameter with the root-mean-square of the water-level fluctuations, and though some indication of a dependence can be inferred, there is too much scatter of the plotted points to arrive at a unique functional relationship. *Subject Headings:* **1. Wind profile above sea 2. Sea surface roughness 3. Gulf of Mexico.**—*Author's abstract.*

SPECIAL WINDS AND WIND EFFECTS

See also: **Equivalent headwinds at high levels** (Graystone), 10.6–20; **Sea ice effects on water level and wind tides, Bay of Bothnia** (Lisitzin), 10.6–79; **Salt spray effects on seaplanes** (Sharp), 10.6–99; **Wind damage to forests, Maine and New Hampshire** (McLintock), 10.6–106; **Harmattan, Ibadan** (Mc Keown), 10.6–164; **Northwesters, Calcutta** (Venkateswara), 10.6–197.

10.6–231 551.555.6(44)

§Rougetet, E., **Le froid de février 1956 dans le Var.** [The cold of Feb. 1956 in the Var Department.] *La Météorologie*, Paris, Ser. 4, No. 47:419–440, July/Sept. **1957.** 11 figs.,

13 refs. English and Spanish summaries p. 419. **DWB**—A detailed synoptic and climatological analysis is given of the cold wave of Feb. 1956 which affected southeastern France, especially the Var Department, which experienced three successive cold waves coming from the northeast and east on Feb. 2, 10 and 12, excessive snowfall on Feb. 19–20, and a snowstorm from the southeast on Feb. 21–22 when intense winds of tornado character caused great damage. The study includes the following: an analysis of the general synoptic situation over western Europe and southeastern France associated with the cold waves; the arrival of the cold waves into the Var Department; temperature, wind and snow conditions at Toulon, Saint Raphael and Luc; extent of snow cover; deviations of daily temperatures of Feb. 1956 from the normal at these stations; temperature minimum in France and in the Var Department; the characteristics of the air masses; a description of the extent of the damage incurred by agriculture, forests, roads and bridges; forest fires as a consequence of desiccation caused by the cold; mortality resulting from the cold; a comparative analysis of the cold of Feb. 1929 and a brief historical account of cold spells in France going back to 1709. The study is provided with synoptic maps with graphs and isoline charts and with numerical data. *Subject Headings:* **1. Cold wave, France (Feb. 1956) 2. Var Department, France.**—*I.L.D.*

10.6–232 551.555.8(624

*Bhalotra, Y. P. R., **Duststorms at Khartoum.** *Sudan. Meteorological Service, Memoir* No. 1, Feb. **1958.** 74 p. 19 figs., photo, 34 tables, 10 refs. **DWB** (M(055) S943 me No. 1)—The study is based on data for the Khartoum Airport for the period 1949–1955. Both summer and winter dust storms are studied and discussed separately. The monthly and diurnal distribution of dust storms, their duration, speed, direction, the reduction in visibility caused by them, and the changes of pressure and temperature occurring during their passage have been tabulated. In regard to the haboobs, their association with thunderstorms, cumulonimbus clouds and rain at the station, has also been stated. A study has been made of the direction of local upper winds, and the upper air temperatures and humidities prevailing at Khartoum on days of haboobs and thunderstorms, and prior to their occurrence. Synoptic charts for the days of dust storms have also been studied in detail and the mechanism of different types of dust storms and the main synoptic features responsible for their occurrence discussed. *Subject Headings:* **1. Dust storms 2. Khartoum, Sudan.**—*Author's abstract.*

10.6–233 551.555.8(5.011

§Sivall, Tage (*Swedish Met. and Hydrological Inst.*), **Sirocco in the Levant.** *Geografiska Annaler*, Stockholm, 39(2/3):114–142, **1957.** 26 figs., tables. **DLC**—After computing the mean monthly cooling power for various localities in the Levant and discussing the characteristics of local winds in this area, particularly the sirocco, and the pressure distribution and associated storm tracks over the Mediterranean, the author describes in detail the meteorological conditions involved in the origin of the sirocco and those accompanying it in Egypt, Israel, Lebanon and also in Syria. The discussion includes the monthly frequency of the sirocco, the circulation factors determining the occurrence of the sirocco (depressions along the V_e and V_f tracks, position of the intertropical convergence zone and temperatures in the areas of origin of the southeasterly current). With the aid of synoptic maps the author analyzes disturbances along V_f tracks and the circulation conditions associated with individual occurrences of the sirocco. The climatic factors associated with sirocco frequency in Syria are considered. *Subject Headings:* **1. Sirocco 2. Synoptic conditions for sirocco 3. Middle East.**—*I.L.D.*

10.6–234 551.555.9:551.43:551.524(2

§Munn, R. E. (*Met. Branch, Canadian Dept. of Transport*), **Temperature variations at the mouth of the St. Lawrence River in January 1955.** *Weather*, London, 13(2):54–57, Feb. 195 2 figs., 3 tables. **DWB**—Comparison of winter temperatures at Mont Joli on the south shore and Seven Islands on the north shore near the mouth of the St. Lawrence River in Quebec. At Seven Islands the Jan. mean temperature is normally 10°F colder (min.) and 4°F colder (max.), with a strong river effect on the wind. The local wind, cloud and temperature conditions at the two stations from Jan. 4–24, 1955, a period when the region was under the influen

of a northeast flow for 19 days and little change in isobaric pattern, are tabulated and discussed. During this period the north bank station (Seven Islands) received an invasion of warm air from the northeast and of cold air from the north, several times before Mont Joli (on south shore) did. Seven Islands was 12° above normal and Mont Joli only 3° above normal that month. *Subject Headings:* **1. Gorge effects on wind 2. Gorge effects on temperature 3. St. Lawrence River Mouth, Quebec, Canada.**—*M.R.*

10.6–235 551.556.8

Charnock, H. (*National Inst. of Oceanog., Surrey*), **A note on empirical wind-wave formulae.** *Royal Meteorological Society, Quarterly Journal,* 84(362):443–447, Oct. **1958.** 4 figs., 16 refs., 4 eqs. **DWB, DLC**—The aim of most empirical wind-wave formulas is to relate some statistic of the wave field with some statistic of the wind field and with an appropriately defined fetch. We shall only consider the wave height, for which various measures are used such as the significant wave height (the mean height of the highest one-third of the waves) and the equivalent wave height (the height of a simple sinusoidal wave which would have the same energy as those observed). If the water surface can be described as a stationary random gaussian surface with a narrow spectrum all such statistics are simply related to the root-mean-square fluctuation of the level of the water surface at a point (Longuet-Higgins, **1952**). *Subject Heading:* **1. Wind-wave relationships.**—*Author's abstract.*

UPPER AIR WINDS

See also: **High alt. radiosonde flights, Greenland** (Lowenthal), 10.6–19; **Equivalent headwinds** (Graystone), 10.6–20; **Upper air wind data, E. Germany,** 10.6–133; **Upper air wind computation techniques** (Rossi), 10.6–137; **Ionospheric drift meas., Wash., D. C.** (Agy), 10.6–169; **General circulation Asia** (Dao, Chen), 10.6–187; **Jet stream data** (Pogosian), 10.6–188; **Wind profile above sea** (Dmitriev), 10.6–228.

10.6–236 551.557:551.510.535:551.501.75

Banerji, R. B. (*Indian Statistical Inst., Calcutta*), **Method of measuring ionospheric winds by fading at spaced receivers.** *Journal of Atmospheric and Terrestrial Physics,* N. Y., 12(4): 248–257, **1958.** 3 figs., 12 refs., 31 eqs. **DLC**—The different statistical methods developed for the measurement of ionospheric drifts by spaced receivers have been reviewed and the essential unity of the basic model brought out. The geometrical method of Putter and the probability-distribution method of the Cambridge School have been merged into a single method which promises to be less laborious than the autocorrelation methods but of comparable accuracy. *Subject Heading:* **1. Ionospheric wind measurement techniques.**—*Author's abstract.*

10.6–237 551.557:551.501.75

Murgatroyd, R. J. and Helliwell, N. C., **The measurement of wind at altitude by airborne instruments.** *Great Britain. Meteorological Research Committee, M.R.P.* 1070, Sept. 27, **1957.** 14+p. fig., 6 tables, 2 refs., eqs. **DWB** M(055) G786m—A Marconi navigation system based on the Doppler principle was installed in a MRP flight jet airplane in 1955 to give accurate estimates of drift and thus to determine errors in wind estimates up to 48,000 ft. Accuracy of winds depends on accuracy of heading readings (to ½° compared with 1°–2° for a repeater compass). Air speed measurements are least accurate. Seven flights were also made near time and place of radiosonde observations. Both visual and photographic measurements were made at one minute intervals. Theory is outlined, photographic methods, geometrical (triangles, squares and reciprocal) flights, comparison flights (with radiosondes) and an analysis of data for both kinds of flights are discussed and presented to show magnitude of error. If true air speed is multiplied by 1.025 and +0.5° is added to all drift angles, the error in wind measurements will be <5 kt. *Subject Headings:* **1. Upper wind measurement by drift 2. Drift wind measurement accuracy.**—*M.R.*

10.6–238 551.557.5:551.513.1:608.4

Riehl, Herbert and Fultz, Dave (*both, Univ. of Chic.*), **The general circulation in a steady rotating-dishpan experiment.** *Royal Meteorological Society, Quarterly Journal,* 84(362):389–

417, Oct. **1958.** 27 figs., 15 refs., 23 eqs. Appendix: Platzman, G. W., **Profile of a minimum meridional flow $\overline{V}'$,** p. 417. 2 refs. **DWB.** "Continuation of a previous paper (*see* 8.8–259, Aug. 1957, *MAB*) entitled **Jet stream and long waves in a steady rotating-dishpan experiment: structure of the circulation."** Also issued as (Chicago. Univ. Dept. of Meteorology, Contract N6ori-02036, Contract AF 19(604)-1292, as **Pt. 2** (with latter title) as Report on Research (unnumbered), Oct. **1957.** 56 p. 27 figs., 14 refs., eqs.—Heat balance is calculated; mechanisms of heat transport are determined; the probable effect of quasi-geostrophic horizontal or nongeostrophic vertical circulations on the heat transport are discussed. The result of computations shows that two or more general circulation "mechanisms" depend on the reference frame chosen. Mathematical solution of energy balance shows that the kinetic energy of the general circulation is produced and maintained by the largest cell and is in turn converted to kinetic energy of smaller circulations. *Subject Headings:* **1. Atmospheric circulation experiments 2. Jet stream models 3. Rotating dishpan models.**—*N.N.*

10.6–239 551.557.5:551.513.2(5)

Sugimoto, Y., **Fluctuation of jet stream in the Far East Asia, Pt. 2.** *Journal of Meteorological Research*, Tokyo, 10(7):554–561, July **1958.** 9 figs., 4 refs., eq. In Japanese; English summary p. 554. **DLC**—In this paper the author studied the jet stream over the Far East for the period 9 to 12 Feb. 1957, and obtained results as follows: (1) When the polar and subtropical jet stream existed apart, the winds accompanied by the polar front jet were stronger than that of the tropical jet stream. (2) After the outbreak of cold air, the polar jet stream axis was sharply shifted southward, and the schematic model combined with the subtropical jet stream axis as shown in Fig. 3. (3) The polar front tropopause was generally found in the 150 to 250mb layer, but when the subtropical jet stream was intensified the height of this layer came down to 300–400 mb (Fig. 6) and the uppermost layer of troposphere and the lower stratosphere are occupied by a cold tropical air mass. (4) Maximum ascending current velocity 50 cm/s was calculated near the core of the polar front jet stream and maximum descending current velocity about 10 cm/s below the polar front tropopause far south of the core of polar front jet stream. (5) Finally, temperature anomaly chart of 100 mb surface was found helpful in forecasting the intensification of the sub-tropical jet stream. (For Pt. 1, *see* 9.9–217, Sept. 1958, *MAB*.) *Subject Headings:* **1. Jet stream variations 2. Far East**—*Author's abstract.*

VERTICAL MOTION

See also: **Pilot balloon ascension rates** (Shmeter), 10.6–134; **Vertical wind velocity meas.** (Shur), 10.6–136; **Vertical current theory** (Vasil'chenko), 10.6–176.

10.6–240 551.55

Fleagle, Robert G. (*Univ. of Washington*), **On the mechanism of large-scale vertical motion.** *Journal of Meteorology*, Boston, 15(3):249–258, June **1958.** 6 figs., 10 refs., 32 eqs. **DWB, DLC**—An equation is derived from the linearized equations of planetary aerodynamics which expresses the vertical component of velocity as a function of baroclinity, static stability, geostrophic vorticity, and geostrophic wind speed toward the north. The properties of this equation are compared with those of other equations and it is concluded that the linear equation provides an insight into the mechanism of large scale vertical motion and that it is simple enough for easy application to real data. Calculations of vertical velocity using the linear theory are compared with calculations using the adiabatic method, with calculations using two nonlinear methods, and with cloudiness and precipitation. The linear theory yields results which are relatively insensitive to errors in observation and analysis, and which compare favorably with results calculated from other methods. On the other hand, it is not notably more accurate than are other methods; all introduce errors which are comparable to the calculated values. *Subject Headings:* **1. Vertical motion 2. Vertical velocities 3. Linear theories.**—*Author's abstract.*

10.6–241 551.558.1:551.524.4:608

Croft, J. F. (*Royal Military College of Science, Wiltshire*), **The convective regime and temperature distribution above a horizontal heated surface.** *Royal Meteorological Society, Qua*

rly Journal, 84(362):418–427, Oct. 1958. 4 figs., 2 tables, 9 refs., 12 eqs. **DWB, DLC**—The convective flow and temperature distribution above a horizontal heated surface in air have been examined by optical methods. Attention has been given both to the open system and to enclosed air layers. The observations show the existence close to the surface of a mode of convection similar to the cellular convective motion previously noted in shallow enclosed layers. This motion is found to be present both in the open system and in the lower part of an enclosed layer of wide separation, i.e., large Rayleigh number. The mean temperature profile in this region has been found for a range of surface temperatures and the results show that the logarithm of the mean absolute temperature (T) varies as the power ($-\frac{1}{2}$) of the height (Z) above the heated surface. This measured distribution has been compared with theoretical predictions in particular that of the PRIESTLEY similarity theory, which properly refers to convection above an infinite surface and in which the postulated conditions will apply more exactly in higher layers. Nevertheless, the measured temperature profile in the surface region is of the form predicted by the PRIESTLEY theory with the experimental value ($-\frac{1}{2}$) in place of the theoretical ($-\frac{1}{3}$) as the power of the height (Z). *Subject Headings:* **1. Convection above heated ground 2. Temperature over heated surface.**—*Author's abstract.*

10.6–242 551.558.2:551.43

Scorer, R. S., **Airflow over mountains: indeterminacy of solution.** *Royal Meteorological Society, Quarterly Journal*, 84(360):182–183, April **1958.** 13 eqs. **Discussion** by G. A. Corby and J. S. Sawyer in *Ibid.*, 84(361):284–285, July **1958. DWB, DLC**—Two equations used in calculating two-dimensional flow over mountains or ridges are derived and discussed with respect to their ambiguity in certain cases. When the wave produces no disturbance at the ground, it must be ignored since the zero value can be added to any wave motion, unless there is a rigid lid above as well as below. Thus all waves not directly attributable to the mountain must be excluded. "The flow above a mountain is approximately represented by cos lz times the mountain shape, together with any lee waves from mountains upstream and the mountain itself." *Subject Headings:* **1. Air flow over mountains 2. Lee wave theories.**—*M.R.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See also: **Hydraulic res. projects,** 10.6–62; **Hydrometeor definitions** (Brooks), 10.6–63; **Hygrometric tables and charts,** 10.6–110; **Condensation nuclei** (Orr et al.), 10.6–249.

10.6–243 551.571.4

Byers, Horace R. (*Univ. of Chicago*), **Significance of different vertical distributions of water vapor in arid and humid regions.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal*, pub. Nov. **1957.** p. 330–335, 2 figs., 2 tables, 10 refs., 6 eqs. **DWB, DLC**—The vertical distribution of water vapor can be expressed by an index coefficient which provides information about eddy and advective transports in a region or in an air mass. The relationship between evapotranspiration and eddy diffusivity of water vapor can be studied in this way. Striking differences in conditions between the arid Southwest and the remainder of the country are shown. (For abstract from another source, *see* 9.5–205, May 1958, *MAB.*) *Subject Headings:* **1. Water vapor vertical distribution 2. Arid zones.**—*Author's abstract.*

EVAPORATION AND EVAPOTRANSPIRATION

See also: **Glacier ablation, Fröya Glacier, N.E. Greenland** (Eriksson), 10.6–75.

10.6–244 551.573:551.524:551.48

Ramdas, L. A. and Narasimhan, S. (*both, Natl. Physical Lab., New Delhi*), **Effect of temperature on the efficiency of monomolecular films in suppressing evaporation.** *Journal*

of Scientific and Industrial Research, Sec. A, 16(8):357–358, Aug. **1957.** fig., 6 refs. **DWB, DLC**—When a water surface is covered with a film of cetyl alcohol, the evaporation therefro is proven to be a function of temperature, and when the film is in liquid or gaseous form higher temperatures its efficiency is less than when it is in a less compressible form, as lower temperature. Discoveries of various scientists along this line are cited. Furth experiments on structure and compressibilities of films in relation to temperature throug them and on the temperature dependence are under way. *Subject Headings:* **1. Temperatu effects on evaporation 2. Evaporation from water surfaces 3. Evaporation control.**—*N.N.*

10.6–245 551.573:551.579(282.272.7

Reo, B. Subba (*Geophysics Dept., Andhra Univ., Waltair, South India*), **The water balan of the Ohio River basin.** *American Meteorological Society, Bulletin*, 39(3):153–154, Mar **1958.** 2 figs., table, 2 refs. **DWB, DLC**—Several methods of computing evapotranspiratio are discussed and THORNTHWAITE's 1948 formula is considered to be the closest to realit Using THORNTHWAITE's 1955 modifications, an even closer estimate is achieved, as shown f the Ohio River Basin, for each month and for the year as a whole. The 1948 method giv 29.7 ft; the 1955 method, 29.2 ft and the estimates based on hydrological measuremen 28.2 ft—which is considered to be very close agreement. The 1955 method allows for s moisture reserve of 12 ft instead of 4 ft, and for variation in rate of evapotranspiration wi varying moisture reserve (if less than field capacity). Tables and nomograms are used calculations. *Subject Headings:* **1. Evapotranspiration estimates 2. Hydrologic cyc 3. Thornthwaite's method 4. Ohio River Basin.**—*M.R.*

10.6–246 551.573:551.577(43

Schmuck, Adam, **Der Wert P-E (Niederschlag minus Verdunstung) bei freien Wa seroberflächen in Polen: ein Berechnungsversuch.** [The *P-E* (precipitation minus evapor tion) index for free water surfaces in Poland: a statistical investigation.] *Acta Geophys Polonica*, Warsaw, 6(1):5–17, **1958.** 9 figs., 4 tables, 7 refs. Polish summary p. 17. **DW DLC**—A paper dealing with the problems of evaporation from free water surface in 1948–19 in Poland. In his calculations the author proceeds from the premise that the value *P* (precipitation minus evaporation from free water surface in the period of rainfalls) is one of t climatological indexes. Evaporation is calculated according to the formula $E=30\ d$, wh E is the sum of annually evaporated water, and d—the sum of mean monthly air-moistu deficit. Graphs show the distribution of evaporation intensity and of the *P-E* value in Pola A graph illustrates the dependence of the same value on height above sea level. *Subj Headings:* **1. Precipitation-evaporation (P-E) 2. Evaporation 3. Poland.**—*A.M.P.*

CONDENSATION

See also: **Icing of aircraft,** 10.6–6; **Dew meas. tech.** (Georgi), 10.6–48; **Icing of high speed aircraft** (Mazin), 10.6–97; **Project Santa Barbara** (Reynolds), 10.6–161; **Condensation nuclei and atmos. elec.** (Mühleisen), 10.6–324.

10.6–247 551.574.11:551.510.

Farlow, N. H. (*U. S. Naval Radiological Defense Lab.*), **A method for measuring wa content of airborne sea-salt particles.** *Journal of Meteorology*, Boston, 15(2):228–230, A **1958.** 2 figs., 14 refs. **DWB, DLC**—The method for measuring directly the water cont of airborne sea-salt slurry particles at the time of their collection utilizes a quantitative chlor reagent film. "Salt water droplets impinging on this film spread over a definite area rela to the quantity of water present. . . . Chlorides in the droplet diffuse into the film and re with silver dichromate reagent producing a clear halo larger than, and concentric about central droplet trace," termed the slurry artifact. "The diameter or area of this trac calibrated as the measure of the water content in the slurry droplet." In calibration, quant tive chloride reagent film is used as a collecting device for slurry droplets aspirated fro suspension containing a measured quantity of levigated aluminum oxide. The proces calibration is described in detail and a calibration curve relating slurry artifact diamete water volume of droplet is constructed. The curve is represented by the equation $y=11.1x$

where y is artifact diameter in cm and x is water volume in cc. The limitations of the method and the application of this method to slurry particles in radioactive fallout are discussed. *Subject Headings:* **1. Sea salt nuclei 2. Sea spray sampling. 3. Radioactive fallout sampling.** —*I.L.D.*

10.6–248 551.574.11:546.15

Malkina, A. D., **Dannye issledovaniĭ nekotorykh fiziko-khimicheskikh svoĭstv chastits iodidov, iavliaiushchikhsia l'doobrazuiushchimi iadrami.** [Results of investigations on some physico-chemical properties of iodide particles, which act as freezing nuclei.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 22:117–124, **1957.** 3 figs., 10 refs. **DWB.** Also her: **Issledovanie fiziko-khimicheskikh svoĭstv chastits iodidov, iavliaiushchikhsia ledoobrazuiushchimi iadrami.** [Study of the physical chemical structure of iodide particles serving as ice-forming nuclei.] *Metcorologiia i Gidrologiia*, Leningrad, No. 1:32–33, **1958. DWB, DLC**—The aerosol forms of AgI, PbI_2 and CdI_2 were examined by the electron microscope. The AgI particles do not have the clear outlines characteristic of hexagonal crystals and their dimensions lie between 3×10^{-6} and 6×10^{-5} cm. PbI_2 forms noncrystalline and crystalline forms of hexagonal shape. CdI_2 aerosol particles are spherical 0.5 to 0.03 in size. On interactions with water vapor AgI and PbI_2 do not alter shape and size. Under the influence of water droplets AgI particles do not change but PbI_2 particles dissolve. Aerosol formed on sublimation of AgI (T_B 600°C) consists 90–85% of Ag and 10–15% of Ag_2O. Aerosol formed by sublimating PbI_2 under the same conditions correspond to the original substance; aerosol formed by burning briquets containing CdI_2 correspond to pure CdI_2. These data are confirmed by electronographic investigations carried out parallel with ultramicrochemical studies of aerosols. The results of such studies are summarized. *Subject Headings:* **1. Nuclei effectiveness 2. Iodide nuclei.**—*I.L.D.*

10.6–249 551.574.11:551.571

Orr, Clyde; Hurd, F. Kenneth; Hendrix, Warren P. (*all, Georgia Inst. of Tech.*) and Junge, Christian (*A.F. Cambridge Research Center*), **The behavior of condensation nuclei under changing humidities.** *Journal of Meteorology*, Boston, 15(2):240–242, April **1958.** 2 figs., refs. **DWB, DLC**—This study of the growth of Aitken nuclei of known composition with humidity was carried out with an apparatus which consisted essentially of air cleaning and pressure regulating equipment, an ion or aerosol generator, devices for sharpening the distribution of ion size, controlled humidity chambers and an ion counter with attached electrical equipment. A schematic diagram of the apparatus is presented and its operation is described. While the experimental method was essentially that of Israel (*Gerlands Beitrage zur Physik* 1:173–216, **1931**) and Junge (*Ber. Deut. Wetterdienst in der US-Zone*, 38:264–267, **1952**), the interpretation differed in that individual ion sizes were examined. "The recorded information was plotted as ion current *versus* voltage applied to the ion chamber at constant humidity giving curves all of which attained the same maximum ion current." The curves were analyzed "to give size distribution as a function of humidity" and the "relationship between collector coltage and size was computed from the geometry of the ion chamber and Stokes' law relating mobility to ion size." Nonhygroscopic particles attract relatively little water vapor up to the limits of the experiment. Hygroscopic nuclei pick up (or lose) large quantities of water and change size, undergoing an abrupt size increase as the solid dissolves to become a droplet. Solution and crystallization occur at conditions characteristic of the material and both occur at lower relative humidities as size decreases. The pickup of moisture by droplets at relatively high humidities corresponds to Kohler's theory. *Subject Headings:* **1. Condensation nuclei 2. Nuclei and humidity 3. Nuclei growth.**—*I.L.D.*

10.6–250 551.574.11:551.577.31:523.51

White, F. W. G. (*Deputy Chairman, C.S.I.R.O., Melbourne*), **Recent advances in the physics of rain.** *Australian Journal of Science*, Sydney, 19(3a):17–23, Jan. **1957.** 2 tables, 7 refs. **DLC**—The mechanism of cloud formation and the subsequent development of cloud droplets and, finally, rain, as propounded by Bergeron, has become an accepted truth among scientists, physicists and meteorologists. Bowen's papers further suggest that there is a causal

connection between the meteor showers that fall upon the earth's atmosphere and high valu of diurnal rainfall occurring contemporaneously in many terrestrial areas. This extraterrestri influence on rainfall is not considered axiomatic among the meteorologists. Cloud dropl -saturation and -condensation have been accepted as the two factors that govern the rainfa at any locality on earth. *Subject Headings:* **1. Cloud physics research 2. Meteoritic show effect on rainfall 3. Diurnal rainfall variations 4. Bowen's theory.**—*N.N.*

10.6–251 551.574.12:551.594.2

Phillips, B. B. and Kinzer, Gilbert D. (*both, U. S. W. B.*), **Measurements of the size an electrification of droplets in cumuliform clouds.** *Journal of Meteorology*, Boston, 15(4):369 374, Aug. **1958.** 5 figs., table, 12 refs., 2 eqs. **DWB, DLC**—The size and the free electr charge of more than 6000 individual natural cloud droplets have been measured. The measur ments were made at a mountain laboratory in southeastern U. S. in stratocumulus clouds and thunderstorm-associated clouds. Stratocumulus clouds with fair-weather electric fields we found to have approximate Gaussian-charge distributions symmetric about zero charge. Th magnitude and distribution of charge observed on these non-storm clouds approach valu described recently by R. Gunn (*see* 6F–353, June 1955, *MAB*) in his theory of aerosol electr fication by the diffusion of environmental light ions. Thundercloud droplets were high electrified and within given cloud volumes the droplets were charged entirely positive, entire negative, or fractionally positive and negative. *Subject Headings:* **1. Cloud droplet size da 2. Electrical charges on drops.**—*Authors' abstract.*

10.6–252 551.574.13:551.594.2

Blanchard, Duncan C. (*Woods Hole Oceanog. Inst.*), **Electrically charged drops fro bubbles in sea water and their meteorological significance.** *Journal of Meteorology*, Bosto 15(4):383–396, Aug. **1958.** 7 figs. (incl. photos), 45 refs., 5 eqs. **DWB, DLC**—A modificatio of Millikan's classic oil-drop experiment was used to determine the electric charge and radiu of drops that were ejected from a bursting bubble at an air-sea water interface. Charg measurements were made of both the natural and the induced charge. Drops of 2 to 20 micro in radius carry natural charges of at least 2×10^2 to 5×10^3 elementary units, respectivel The induced charges are considerably higher, reaching 10^6 elementary units on drops of 5 microns radius. The sign of the natural charge is positive on drops < about 4 micron For larger drops both the sign and magnitude of the charge appear to be a function of th depth of water through which the bubble rises. The meteorological significance stems fro the fact that rain and snow, as well as whitecaps, can produce great numbers of small bubbl in the surface waters of the oceans. Both laboratory and field work suggest that the majorit of these bubbles produce positively charged drops that contribute to the atmospheric spac charge. Of special significance is the fact that, for positive induction fields less than abou 25 v cm^{-1}, a positive charge is found on the small drops. For fields greater than 25 v cm the induced negative-charge exceeds the natural positive-charge and so the drops carry a n negative-charge. Consequently, small bubbles breaking at the surface of the sea in th presence of the earth's fair-weather positive field of about 1 v cm^{-1} will produce drops tha carry a positive charge. Calculations based on measurements of the bubble spectrum produce by whitecaps indicate that the charge on the drops may, under some conditions, provide counter-current of the same order of magnitude as the fair-weather conduction current. Th the sea may be a source as well as a sink for the charge that maintains the earth's positiv electric-field. *Subject Headings:* **1. Bubble electricity 2. Ocean-atmosphere interactio 3. Electrical charges on droplets from bursting bubbles.**—*Author's abstract.*

10.6–253 551.574.

Day, John A. (*Oregon State College*), **On the freezing of three to nine micron water droplet** *Journal of Meteorology*, Boston, 15(2):226–228, April **1958.** 3 figs., tables, 3 refs. **DW DLC**—The author investigated the freezing temperature of a large number of three to nin micron water droplets, and attempted to determine values for the surface free energy of th water-ice interface at different temperatures. The procedure involved the production of sma water droplets by a collapsing water jet formed when tiny air bubbles blown under high pressure from a hair-tip capillary break the surface. The small droplets are deposited on th

tically polished surface of a small copper plug which fits into holes of a copper tube which rves as a heat sink. The method of recording data with a movie camera is described with e aid of a diagram. Data are presented for three, six and nine micron water droplets in aphs showing the number of frozen droplets of a particular size class as a function of spon- neous freezing temperatures. Ninety-five % of the freezing sequences were completed thin 100 seconds, about 25% were completed in 10 seconds within this group. All droplets thin the same size class did not freeze at the same temperature. In the nine micron class 34.5°C represents the homogeneous nucleation of the 12 micron droplets in this class. Tem- ratures of −36°C and −37°C are reasonable values for homogeneous nucleation in the three id six micron class, respectively. The fundamental rate equation for homogeneous nucleation

$$J \approx \frac{nkT}{h} \exp\left[-\frac{A}{kT}\right] \exp\left[-\frac{30.7\sigma_{1s}^3}{kp_s^2 L_F^2} \overline{T\left(\ln\frac{T_0}{T}\right)^2}\right].$$

ata on the spontaneous freezing temperature of droplets with diameters of various size asses are presented in a table. *Subject Heading:* **1. Freezing of water droplets.**—*I.L.D.*

FOG

See: **Air flow types, San Francisco Bay area** (Smalley), 10.6–223; **Atmos. transmission** (Eldridge, Johnson), 10.6–309; **Visibility in fog** (Olivier), 10.6–311.

CLOUDS

See also: **Clouds** (Ludlam, Scorer), 10.6–26; **Cloud film strips,** 10.6–27; **Hydrometeor definitions** (Brooks), 10.6–63; **Cloud motion pictures** (von Arx), 10.6–141; **Warming-cloudiness relationships** (Antal), 10.6–179; **Northwesters, Calcutta** (Venkateswara, Marik), 10.6–197; **Raindrop size distrib.** (Roy, Srivastava), 10.6–273; **Refractive index gradients, Bahama Is.** (Braham, Harrington), 10.6–312.

10.6–254 551.576.1:551.553.21

Biswas, K. R. and Srivastava, R. C. (*both, Rain & Cloud Physics Res. Unit, Natl. Physical b., New Delhi*), **Size spectrum of cloud particles in monsoon clouds over Khandala on the estern Ghats.** *Journal of Scientific and Industrial Research, Sec. A,* New Delhi, 17(6):235–0, June **1958.** 3 figs., table, 5 refs. **DWB, DLC**—The results of measurements made on oud particle sizes in ground-based monsoon clouds at Khandala on the Western Ghats are esented. In normally raining clouds the size distribution of cloud particles even at a small ight above the cloud base is wide enough to initiate cloud droplet growth by collision-cum- alescence mechanism. On the other hand, shallow and relatively stable clouds are associated th a narrow spectrum. *Subject Headings:* **1. Cloud particle sizes 2. Monsoon clouds Khandala, India.**—*Authors' abstract.*

10.6–255 551.576.1:778.3

Scorer, R. S. (*Imperial College of Sci. and Tech., Univ. of London*), **The dynamics of mma.** *Science Progress,* London, 46(181):75–82, Jan. **1958.** 12 figs., table, 4 refs. **DLC**— ie various types of mamma are described and illustrated and an attempt is made to explain e phenomenon dynamically or thermodynamically. Snow gives the most distinct mammatus ouds. They may occur in St Cu, CuNb, ACu, ASt or Cirrus Uncinnus. The latter are d to be the most delicate and beautiful of all mamma. Evaporation of fallout (rain or ow) leaves only the larger particles which are most visible at sunset. Negative thermals are volved, also. *Subject Headings:* **1. Mammatus clouds 2. Cloud photographs 3. Dynamics mammatus.**—*M.R.*

10.6–256 551.576.11(213)

Harrington, Edward L. (*Univ. Chicago*), **Observations on the appearance and growth of pical cumuli.** *Journal of Meteorology,* Boston, 15(2):127–130, April **1958.** 4 figs., 2 tables, refs. **DWB, DLC**—During studies of trade wind cumuli in the vicinity of Puerto Rico ried out in the winter of 1953–54 and autumn of 1954, the following observations were made.

Large trade wind cumuli were found daily within about 30 mi of the north shore of the isla and within about 60 mi of the south shore. Clouds were found to grow in groups; wit any one group some occurred in lines, others were relatively isolated and showed no pattern orientation. The occurrence of favorable and unfavorable areas of cloud existence w paralleled by a pattern of spatial distribution of precipitating clouds. Over water trade-w cumuli are characterized by uniformity in the height of cloud bases, most of these cum exhibited a tilt in the direction of the vertical wind shear vector. A study of the rate ascent and descent of the cloud-tops based on time lapse movies indicated the following: rise of cloud tops was not continuous but in steps. Growth rate computations for ra echoes in New Mexico, Ohio and near Puerto Rico and for cloud top in New Mexico and Pue Rico reveal that growth rates of over-water trade wind cumuli are considerably less th those for cumuli over the United States. *Subject Headings:* **1. Tropical clouds 2. Cumu cloud structure 3. Puerto Rico.**—*I.L.D.*

10.6–257 551.576.11:551.578

Shishkin, N. S., **Issledovanie oblachnosti, daiushcheĭ osadki v vide snega.** [Investigati of cloudiness yielding precipitation in the form of snow.] *Leningrad. Glavnaia Geofizicheskaĭ Observatoriia, Trudy,* 57(119):111–112, **1956.** 3 figs. **DLC**—During an airplane flight ma to study the structure of clouds, measurements were made of the sizes of snowflakes. T diminution of the diameter of snowflakes with height is indicated. The temperature d tribution in the clouds is shown graphically and data on sizes of snowflakes at various lev are presented. The snowflakes were either lamellar or star shaped. The maximum incre in the diameter of snowflakes during their fall through clouds of mixed structure amounted 5 mm/km. *Subject Headings:* **1. Cloud structure studies 2. Snow crystal structure.**—*I.L.*

10.6–258 551.576.12:778.58:551.507.3

Vonnegut, Bernard (*Arthur D. Little, Inc.*) and Atkinson, Berton M. (*Univ. of Minneso* **Motion-picture time-lapse photography from high-altitude balloons.** *Journal of Meteorolo* Boston, 15(2):232–234, April **1958.** 4 figs., 4 refs. **DWB, DLC**—The authors describe technique for taking time-lapse motion pictures from above clouds for longer periods of ti This involved attaching a time-lapse camera on a hitch-hike basis to a Skyhook balloon. T camera, the box housing the camera (illustrated by photographs) and the balloon launchi are described. Out of three flights made over Minnesota in the summer of 1956 on days slight convection, one flight provided pictures of small fair weather cumulus clouds. T pictures obtained show that the high altitude balloon is a very stable platform for time-la photography. The primary difficulty arose from torsional oscillation of the camera on load line and a slow rotation of the balloon. By means of the orthographic projection techni of VON ARX it should be possible to make wide-angle time lapse motion pictures show weather development in areas of many thousands of square miles. *Subject Headings:* **1. Tim lapse photography 2. Cloud moving picture photography 3. High altitude balloons.**—*I.L.*

10.6–259 551.576.4(521.27):551.509

*Yamada, N., **Ceiling at the Tokyo International Air-Port.** *Journal of Meteorolog Research,* Tokyo, 9(10):721–739, Oct. **1957.** 19 figs., 16 tables, ref. In Japanese, Engl summary p. 271. **DWB, DLC**—A statistical study of ceiling at the Tokyo International A Port is made, based on the data of 2 yrs (1950–1951). Many tables and figures which may useful for the daily forecasting of ceiling at the air-port are obtained. In these tables a figures are given: (1) hourly and monthly mean ceiling height, (2) frequency of occurrence specified ceiling height and specified persisting time for specified ceiling height ranges, (3) nu ber of occurrence of specified ceiling height for specified dew-point depression and ceil constitution, (4) relation between ceiling height and surface wind (speed and direction) a (5) number of occurrence of specified ceiling constitution corresponding to its specified persist time. Some synoptic considerations for the low ceiling condition (less than 200 feet) described. *Subject Headings:* **1. Ceiling data analysis 2. Ceiling height forecasting 3. Tok Japan.**—*Author's abstract.*

PRECIPITATION

See also: **Rainfall and runoff, Australia,** 10.6–15; **Hurricane rainfall patterns, E. Coast, U. S.** (Schoner), 10.6–17; **Forest effects on precip., U.S.S.R.** (Kuznetsova), 10.6–105; **Radar analysis of rain** (Sal'man), 10.6–125; **Precip.-evaporation [P-E], Poland** (Schmuck), 10.6–246; **Clim. and vegetation, Tunisia** (Vernet), 10.6–299; **Sunspot effects on rainfall, Huancayo, Peru** (Roldan Seminario, Vallejo), 10.6–306.

10.6–260 551.577.3(546)

*Bhan, S. N. (*Met. Obs., Srinagar*), **Rainfall in the upper catchment of Jhelum.** *Indian urnal of Meteorology and Geophysics*, New Delhi, 9(1):51–62, Jan. **1958.** fig., 10 tables. **WB, DLC**—An analysis of the rainfall in the upper catchment of the Jhelum on the basis data from 5 rain gage stations (Durroo, Anantnag, Kulgam, Pulwama and Srinagar) exnding over varying periods from 30 to 54 yrs. The discussion covers the following: normal infall; rainfall distribution during July to Sept.; mean intensity of daily rainfall; distribution rain according to different intensities in 24 hrs; duration of rainfall spells; longest rainy ells; occasions of heaviest rainfall in a day; and gage readings at Sangam, 25 mi. from inagar. Numerical data dealing with these various aspects of rainfall are presented in bles. *Subject Headings:* **1. Rainfall regime 2. Jhelum River Basin, India.**—*I.L.D.*

10.6–261 551.577.21(54)

*Sinha, K. L. (*Met. Office, Jodhpur*), **Some inferences from the average rainfall per rainy y in India.** *Indian Journal of Meteorology and Geophysics*, 9(2):198–199, April **1958.** ref., ble. **DWB, DLC**—Data for 10 stations in India are calculated for each month to show gional and seasonal differences in average rainfall per rainy day. For instance, at Srinagar e average is the same throughout most of the year (0.39 to 0.49″ range), whereas Cherrapunji nges from 0.50″ in Jan. to 4.24″ in June. *Subject Headings:* **1. Rainfall intensity data India.**—*M.R.*

10.6–262 551.501:551.577(268)

§*Spinnangr, Finn, **Some remarks on precipitation measurements at sea.** *Meteorologiske nnaler*, Oslo, 4(7):123–142, **1958.** 3 figs., 5 tables. **DLC**—Owing to the numerous difficulties volved in measuring precipitation at sea, the reliability of such measurements varies from e ship to another. Accordingly, the author made comparisons of the amounts of precipitaon due to warm front surfaces measured at the Faroe Islands (Torshavn) and at Ocean eather Station M; the warm front surfaces had a movement from S.W. towards N.E. Also e precipitation amounts from showers in unstable northwesterly air currents measured at ation M and at Svinöy and Ona (islands off the Norwegian Coast) were compared. The ographic conditions on the Faroe Islands are described with the aid of a map and monthly d annual precipitation for ten years at Station M, Torshavn, Svinöy, Ona, Sula and Skomvaer e presented. In the case of a warm front surface from the southwest, of which ten examples e analyzed synoptically, the precipitation amounts at Torshavn were reduced by 50% cause of orographic conditions so that the measurements at Station M were on the average ly half of the real amounts in the area. For unstable air current over the southern Norgian Sea, the gage at Station M seems to have caught ¼ of the real precipitation amount over e sea area. A study of 15 cases of unstable NW-N air current over the southern Norwegian a shows that the gage at Station M probably caught only half of the real precipitation on e sea at this place. Finally, the occurrence of moderate (or heavy) rain and of moderate heavy showers at Station M was found to be relatively high but considerably higher in the orth Atlantic and in the North Sea. *Subject Headings:* **1. Precipitation at sea 2. Norwegian a.**—*I.L.D.*

10.6–263 551.577.2:551.579.5(52)

Uemura, H., **On the relation between the variations of precipitation and ground water at agoshima.** *Journal of Meteorological Research*, Tokyo, 9(12):867–869, Dec. **1957.** 4 figs., ble, ref., eqs. In Japanese; English summary p. 867. **DWB, DLC**—The author examined e relationship between the variations of the amount of daily precipitation and the variation

of the water level of the well at the Kagoshima District Meteorological Observatory, dur the period from July, 1955 to April, 1956. The results are shown in figs. *Subject Headi* **1. Ground water-precipitation relationships 2. Kagoshima, Japan.**—*Author's abstract.*

10.6–264 551.577.3(43

Péczely, György, **Van-e mediterrán jelleg Magyarország csapadékjárásában?** [Is th a Mediterranean character in the precipitation regime of Hungary?] *Időjárás*, Budap 61(2):95–98, March/April **1957.** 3 figs., eq. French summary p. 95; English version p. 1 158. **DLC**—The following index is proposed for determining the Mediterranean character precipitation series: $M = \sum_{i=1}^{12} [Pi - pi]$ where *Pi* represents the monthly values of a typ Mediterranean precipitation series (average of precip. normals for Marseille, Cagliari, Mess Rome and Athens) expressed in percent of the annual amount, and *pi* represents the sa monthly values for the station investigated. The geographical distribution of values of *M* Hungary is shown in charts. The precipitation regime of Hungary is found to have no nificant Mediterranean component. *Subject Headings:* **1. Precipitation regime 2. Hung** —*G.T.*

10.6–265 551.577.32:519.2(522

Inagaki, T., **Some characters of precipitation observed at Izuhara.** *Journal of Mete logical Research*, Tokyo, 8(1):48–50, March **1956.** fig., table, 3 refs., 3 eqs. In Japan **DWB, DLC**—Annual rainfall at Izuhara (Tsushima Island) is 500–700 mm higher than t of the northern Kyushu plain; heavy rainfall comes mostly when a low pressure front acc panied by a warm front passes between Tsushima and Puzan. Statistical analysis is m with rainfall and upper atmospheric layer data at Izuhara; the shear of upper-layer win proportional to temperature gradient at isobaric surface. The preliminary report inclu discussions on lower layer mixing ratio, relations between altitude variation and thickn and convergence-divergence and rainfall. *Subject Headings:* **1. Statistical analysis of rain 2. Annual rainfall variations 3. Izuhara, Japan.**—*J. Woo.*

10.6–266 551.577.37:551.515.2(7

†*Bruce, J. P. (*Dept. of Planning and Development, Ontario*), **Preliminary estimates probable maximum precipitation over southern Ontario.** *Engineering Journal*, Montr 40(7):978–984, July **1957.** 3 figs., 5 tables, 22 refs. **DLC**—Maximum probable pre (depth-area-duration) data for hurricane storms are differentiated from data for thunderst for southern Ontario for areas of 10 to 5000 sq mi and duration of 6, 12, 24, 36 and 48 Data are shown on a graph and in tables and are discussed as to accuracy, assumptions, lim tions, methods of compilation, etc. "Hazel" (Oct. 14/15, 1954) was used as a basis for calc tions of hurricanes, but other storms were considered. Thunderstorms of July 1909, A 1914, Sept. 1926 and June 1944 were considered for that type of precip. Methods of U. S. W. B. Hydrometeorological Section were employed in analysis. *Subject Headi* **1. Maximum precipitation data 2. Rainfall depth-area-duration studies 3. Hurric "Hazel" (1954) 4. Hurricane rainfall 5. Southern Ontario.**—*M. R.*

10.6–267 551.577.37(9

*Ganesan, V. (*Regional Met. Center, Nagpur*), **Incidence of heavy rain at Minicoy.** *Ind Journal of Meteorology and Geophysics*, 9(2):145–150, April **1958.** fig., 7 tables, 9 refs. **DV DLC**—Sixty years of rainfall data of Minicoy have been analyzed and frequency table heavy rain have been presented. Rainfall associated with storms and depressions and with first advance of the monsoon has been discussed. A preliminary study of squally weather also been attempted. *Subject Headings:* **1. Heavy rainfall data 2. Rainfall intensity 3. Minicoy, India.**—*Author's abstract.*

10.6–268 551.577.38(571,58

*Fel'dman, Ia. I., **Osobennosti meteorologicheskogo rezhima zasushlivogo 1955 g raĭonakh tselinnykh i zalezhnykh zemel' Severnogo Kazakhstana i Altaĭskogo kraia.** [C

teristics of the meteorological regime during the dry year of 1955 in virgin and waste land eas of northern Kazakhstan and the Altai region.] *Akademiia Nauk SSSR, Izvestiia, r. Geog.*, No. 2:45–53, **1956.** 3 figs., 6 tables, 4 refs. **DWB**—The drought of 1955 in the irgin and waste land of northern Kazakhstan and the Altai region was not only a consequence unfavorable summer meteorological conditions but also of the preceding winter-spring and ll seasons. A deficiency of precipitation characterized the entire fall-winter-spring period 1954–1955 in the greater part of this region. A detailed analysis is presented of precipitation, mperature and relative humidity regime during this entire period; and the atmospheric rculation over this area is analyzed in terms of prevailing zonal and meridional circulation. umerical and graphical data are presented on precipitation during the cold period 1954–55 nd precipitation normals for the same period; water supply in the snow cover at beginning snow melt; atmospheric temperature of the cold period 1954–55 and normal temperatures r the same period; temperature sums above 10°C; sequential weather variation during lay–June 1954 and 1955 in the Pavlodar District, etc. *Subject Headings:* **1. Drought, Kazakhstan (1955) 2. Drought, Altai Region (1955) 3. Drought analysis 4. Kazakhstan, .S.R. 5. Altai Region, U.S.S.R.**—*I.L.D.*

10.6–269 551.577.38:551.583.13(51)

Kao, Yu-hsie (*Inst. of Geophysics and Met., Academia Sinica*), **On the high autumn clear eather in China.** *Acta Meteorologica Sinica*, Peking, 29(2):83–92, May **1958.** 10 figs., able, 12 refs. In Chinese; English summary p. 92. **DWB**—In this paper, the well-known henomena of the so-called high autumn clear weather in China is defined and the regions here it most frequently occurs are also determined. After analyzing the variation of 5-day ean rainfall patterns, the dates of its onset and ending are then given. Meanwhile, it is ointed out that these dates are also the dates of the beginning of the winter monsoon or etreat of summer monsoon in the surface layer and the onset of the westerly jet-stream over .E. Asia or ending of the influence of summer monsoon in the upper level, respectively. Besides, in comparing the said weather with Indian summer in North America and "old-wive's eather" in Europe, it is found that there are some dissimilarities among them, especially the ifference in the formation factors. *Subject Headings:* **1. Precipitation singularities 2. Jet tream over S.E. Asia 3. China.**—*Author's abstract.*

RAIN AND SNOW

See also: **Max. snow loads, Canada** (Thomas, Boyd), 10.6–109; **Raindrop size distrib. instruments** (Brown), 10.6–142; **Snow sampling instruments** (Grunow), 10.6–143; **Pollen washout by rain** (May), 10.6–165; **Soil temp. under snow** (Lappo), 10.6–213; **Cloud structure studies** (Shishkin), 10.6–257.

10.6–270 551.578.1(524)

Noguchi, M., **Precipitation in Sōya District.** *Journal of Meteorological Research*, Tokyo, 0(7):573–580, July **1958.** 9 figs., 2 tables, 3 refs., eqs. In Japanese; English summary p. 573. **LC**—The author examined the rainfall mechanism in Soya District as to: (1) relation between istribution of rainfall amount and path of disturbance; (2) dry air mass-rainfall relationships; 3) relation between vertical or horizontal instability and rainfall amount. *Subject Headings:* **Synoptic conditions for rainfall 2. Soya District, Japan.**—*From author's abstract.*

10.6–271 551.578.1:551.585.9:551.577.37(521.26)

Tsuchiya, I., **On the distribution of the core of heavy rainfall and mesoclimatic division: ase of Kanagawa Prefecture.** *Journal of Meteorological Research*, Tokyo, 10(6):475–479, une **1958.** fig., 2 tables, 4 refs. In Japanese; English summary p. 475. **DLC**—The author xamined the distribution of the core of heavy rainfall and mesoclimatic division by using 214 eavy rainfalls in Kanagawa Prefecture from 1924 to 1956, and concluded that Kanagawa refecture may be classified into five regions from the viewpoint of mesoclimatology of heavy ainfall, i.e., Mt. Tanzawa, Mt. Hakone, Miura Peninsula, the region of Oiso and the rest. *ubject Headings:* **1. Rainfall distribution 2. Mesoclimatology 3. Kanagawa Prefecture, apan.**—*Author's abstract.*

10.6–272 551.578.11/13(7

Junge, Christian E. (*GRD, A.F. Camb. Res. Cen.*) and Werby, R. T., (*Werby Laboratori Inc.*), **The concentration of chloride, sodium, potassium, calcium and sulfate in rain wa over the United States.** *Journal of Meteorology*, Boston, 15(5):417–425, Oct. 1958. 9 fig 5 tables, 23 refs. **DWB, DLC**—The distribution of yearly averages of the concentration various inorganic ions in rainwater over the United States is discussed. The major sour of Cl^- is the ocean. The Cl^-/Na^+ ratio, however, is considerably less than that in sea wat It is very likely that this is caused by excess Na^+ from the soil. A similar distribution excess material from the soil is observed with K^+. In contrast to Na^+ and K^+, which a rather uniformly distributed over the U. S., Ca^{++} shows highest values over the Southwe in agreement with the occurrence of dust storms. Most of the SO_4^{--} over the ocean origina from sea spray. The source of additional SO_4^{--} is the land. Budget considerations indica that about 30% of this additional SO_4^{--} on a global scale is due to human activities. On t basis of the data presented, the average global residence time of SO_2 is estimated to be days. This value is compared with available data on residence times of other constituer which are also primarily controlled by washout. *Subject Headings:* **1. Rain compositi 2. Rainwater analysis 3. United States.**—*Authors' abstract.*

10.6–273 551.578.11:551.5

Roy, A. K. and Srivastava, R. C., (*both, Rain and Cloud Physics Res. Unit, C.S.I. New Delhi*), **A theoretical study of progressive developments in raindrop size distributi and other characteristics in rain showers from 'warm' convective type clouds.** *Indian Jour of Meteorology and Geophysics*, Delhi, 9(3):213–224, July 1958. 3 figs., 5 tables, 9 refs. **DW DLC**—A study, on a theoretical basis, of the expected size distribution of raindrops, and raint intensity at various phases of rain showers from an overhead large cumulus cloud of 'war type has been made, assuming that each raindrop is the result of growth on a 'giant' sea-s nucleus, and that droplet growth beyond a certain size is due mainly to coalescence followi collisions between cloud droplets. The study, based on assumptions of plausible physi conditions in a cloud in regard to (a) concentration and size distribution of giant sea-s nuclei in air, (b) mean cloud liquid water content and (c) updraft rate and its variations w time, brings out features which are in general conformity with what are observed in rain fr warm convective type clouds, and provides some corroboration of the present accepted the of coalescence growth of raindrops, and of the salt-nucleus hypothesis of rain formation such clouds. *Subject Headings:* **1. Raindrop size distribution 2. Convective cloud structu 3. Rain from nonfreezing clouds.**—*Authors' abstract.*

10.6–274 551.578.13:519.241.6(521.

Goto, T., **On the locality of the distribution of rainfall amount over Izumo Distr Shimane Prefecture.** *Journal of Meteorological Research*, Tokyo, 8(12):789–791, Jan. 19 3 figs., table, 5 refs. In Japanese. **DWB, DLC**—The coefficient of variation is determi from ratio of standard deviation to mean value of data of 70 rainfalls greater than 10 mm dur Bai-u periods from 1950–1953 in Izumo District, Shimane Prefecture. About 50% of t quency is distributed around the coefficient of variation of 0.3. It seems that coefficient variation decreases as Bai-u front moves north, the coefficient becomes greater as Bai-u fr moves south. The coefficient of variation decreases abruptly with increasing altitude w mixing ratio rises. *Subject Headings:* **1. Rainfall variations 2. Coefficient of variation 3. S mane Prefecture, Japan.**—*J. Woo.*

10.6–275 551.578

Fujiwara, M. (*Met. Res. Inst., Tokyo*), **Note on collision frequency of snowflakes.** *J teorological Society of Japan, Tokyo, 75th Anniversary vol. of the Journal*, pub. Nov. 19 p. 57–64. 3 figs., 6 tables, 9 refs., 12 eqs. **DWB, DLC**—In a previous paper (1), the aut has described some evidence which indicates the importance of collision between snowfla in the mechanism of size distribution of precipitation elements. Accordingly, the follow observed phenomena have led us to the expectation of a frequent collision; (1) simultane changes in the number of large and small flakes usually are observed on the ground, (2) gi aggregates are produced by some cohesive process within a thin melting layer. Shapes a

structures of individual snowflakes are not simple. Variation in aggregate form will result in that of the fall velocity. Some of the snowflakes, definitely are known to fall, fluttering or rotating. This complexity in motion may cause both the relative velocity and the collision cross-section and, consequently, the frequency of collision to increase appreciably. The former problem is discussed later. But, if there exists no such an effect as that of a snowflake dodging about another, the influence of random motion upon the mean collision cross-section may be insignificant. So the orientations and, accordingly, also the cross-sections of flakes under study will be assumed to remain constant through the sweeping. So far, values of collision frequency as to raindrops have been estimated by some investigators. Therefore, evaluation of the ratio of collision frequency of snowflakes to that of raindrops will be made. *Subject Headings:* **1. Snowflake collision frequencies 2. Snowflake velocities.**—*Author's abstract.*

10.6–276 551.578.46

Kosarev, M. V., **K voprosu o vozmozhnosti opredeleniia moshchnosti snezhnogo pokrova v verkhneĭ zone gornoĭ doliny po dannym izmerenii snega v nizhneĭ zone toĭ zhe doliny.** [The possibility of determining snow cover thickness in the upper zone of a mountain valley from snow measurements in the lower zone of the same valley.] *Tashkent. Geofizicheskaia Observatoriia, Trudy*, No. 10(11):171–175, **1954.** 2 figs., 2 tables. **DLC**—The possibility of such determinations seems to be confirmed by means of determining, on the basis of a considerable number of observations, the gradient of snow distribution in the Kzylcha River Valley where a regular increase of the snow cover thickness with height was observed for three consecutive years 1950–1953. Using the data of snow surveys during that period the gradient of water content in the snow cover was established, and with its aid the water content for snow survey points situated in the valley was calculated. The results were in good agreement with actual measurements (only 10% were erroneous). The study and experimentation of this continues. *Subject Headings:* **1. Snow cover depth 2. Snow cover distribution with elevation 3. Kzylcha River Valley, Uzbek S.S.R.**—*A.M.P.*

10.6–277 551.578.71

Shishkin, N. S., **O mekhanizme obrazovaniia grada.** [Mechanism of hail formation.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 74:32–40, **1957.** 3 figs., 3 tables, 6 refs., 13 eqs. **DWB** (M(055) U581 tg)—The physical conditions of hail formation require that, within the zone from the freezing level of cloud droplets to the 0°C isotherm, the concentration of ice particles should be much smaller, the concentration supercooled drops, the presence of intensive and continuous ascending air currents reaching heights of 6–9 km and higher, and the growth of ice particles attaining considerable size. The large sized particles are generally found in the middle of clouds when the ascending currents are uniform and the greater difference in the concentration of frozen and unfrozen drops is found in the central part of the cloud. The most probable origin of hail is in the center of the cloud, near the level of the peak trajectories of the first precipitation particles. Hail is formed only when the velocities of ascending currents exceed critical values. It is shown by means of graphs that the radius of spherical particles increases with their height above the level of the cloud base, that the radius of hail is directly proportional to the velocity of ascending currents and that the time required for the formation of hail for a wide range of velocities of ascending currents is 30–40 sec. A formula is developed for computing the velocity of ascending currents namely:

$$\Delta\left(\frac{\omega_v^2}{2}\right) = C_p[(\gamma-\gamma_v)-S_v(\gamma_c-\gamma_v)]\Delta h,$$

where $V\omega_v$—velocity of vertical motion of moist (cloudy) air, c_p—heat capacity of air at constant pressure, γ, $\gamma_v+\gamma_c$—values of actual, moist adiabatic and dry adiabatic temperature gradient, S_v—amount of convective clouds and Δh—height of cloud layer. The results of calculations of ascending air velocities during hail fall are presented in tables and confirm the mechanism of hail formation proposed by the author. *Subject Headings:* **1. Hail mechanism 2. Hail formation.**—*I.L.D.*

HYDROMETEOROLOGY

See also: **Floods, New Zealand,** 10.6–16; **River shipping and water level recorders** (Mikhaĭlov), 10.6–49; **Ground water-precip. relationships, Kagoshima, Japan** (Uemura), 10.6–263; **Statistical analysis of hydrologic data** (Balek), 10.6–278.

10.6–278 519.2:551.57

Balek, Jaroslav, **Užití metod matematické statistiky při zpracování hydrologických jev pozorovaných v témže profilu po různě dlouhá období.** [Use of mathematical statistics in th analysis of hydrological data representing periods of varying length for the same location.] *Meteorologické Zprávy*, Prague, 10(6):139–143, **1957.** 6 figs., 6 tables, 5 refs. Russian an English summaries p. 139. **DWB**—The usefulness of PEARSON's 3rd order curve in hydro logical data analyses is tested by comparing results derived from 130 yrs of data (1826–1955 for the Vltava River at Prague, with those derived from 30 yrs of data. The method is usefu for the analysis of data of a limited period, but not for drawing general conclusions for period other than the one analyzed. *Subject Heading:* **1. Statistical analysis of hydrologic data.**—*G.T*

10.6–279 551.453:551.573:551.579(540,549

*Bhatia, Shyam Sunder (*Panjab Univ. Camp College, New Delhi*), **Arid zone of India an Pakistan: a study in its water balance and delimitation.** *Indian Journal of Meteorology an Geophysics*, Delhi, 8(4):355–366, Oct. **1957.** 3 figs., 6 tables, 5 refs. **DWB, DLC**—Lon period records for 60 stations in India and Pakistan are used to determine various parameter entering into the calculation of the water need (cm), and deficiency (in arid zone), and Thorn thwaite's aridity and moisture indexes. These are compared with KÖPPEN's types, DE MAR TONNE's indices and rainfall for selected stations. Data are shown in tables and on charts Conclusion is that THORNTHWAITE's method gives the most realistic idea and limits of ari zones in India and Pakistan. Individual places and elements are discussed. *Subject Heading* **1. Arid zones 2. Water balance data 3. Potential evapotranspiration 4. Thornthwaite' index 5. India 6. Pakistan.**—*M.R.*

10.6–280 628(54) 551.579:551.577(54

†*India. Central Board of Irrigation and Power, **Annual Report (Technical), 1952, Vol. 1–2** Ed. by M. L. Aggarwal. Its *Publication*, No. 56, pub. New Delhi, Sept. **1954.** 540 p. numer ous figs., tables, bibliogs. throughout. Subject Index in Vol. 1. List of publications issue by the Board, Vol. 1, p. 250–251. **DWB** (626.8 139a)—The two volumes contain reports o irrigation research, hydraulic research, river research, etc. at nine different institutes in India Sec. D of Vol. II (p. 335–399) gives rainfall and runoff measurements, hydrographs, flood dat (analysis of the ground flood of September 1947 for Sutlej and Beas Rivers). Tabulations discussions, and graphical presentations give rainfall week-by-week for the year for each regio An article on **Rainmaking in India** is included on page 371–379. (*See* 6.7–13, July 195 *MAB*, for 1949 Report, Pt. 1.) *Subject Headings:* **1. Annual hydrometeorological report 2. Rainfall data for India 3. India. I. Aggarwal, M. L.** (*ed.*).—*M.R.*

10.6–281 551.57

Kritskiĭ, S. N. and Menkel', M. F., **K voprosu ob otsenke veroiatnoĭ povtoriaemos gidrologicheskikh velichin.** [Problem of determining the probability of recurrence of hydro logical values.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:52–53, March **1957.** 4 refs 3 eqs. **DWB, DLC**—A number of formulas employed in hydrological practice to determi the probability of occurrence of various hydrological magnitudes are presented. These are:

$$(1)\quad P_m = \frac{m-0.5}{n}$$

$$(2)\quad P_m = \frac{n}{n+1}$$

$$(3)\quad P_m = \frac{m-0.3}{n+0.4}$$

P_m—probability of the element selected occupying a position m in the order of decrease i

selection from n elements. The logical basis of each of these formulas is analyzed and the greater reliability of formula (3) is pointed out. *Subject Heading:* **1. Hydrologic frequency analysis.**—*I.L.D.*

10.6–282 551.579.1(477.3)

Kubyshkin, G. P., **O vertikal'noĭ zonal'nosti raspredeleniia godovogo stoka rek Zakarpat'ia.** [Vertical zonal distribution of annual runoff in the Transcarpathian rivers.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:34–35, April **1957.** fig., eqs. **DWB, DLC**—The dependence of runoff upon height of a locality was analyzed on the basis of runoff data for 29 points of Transcarpathia selected at elevations from 387 to 1134 m over an area of 12,600 km². A map showing the distribution of runoff as a function of height of a locality and degree of moisture content of an area is presented. This relationship can be expressed by the equation for each of the three zones established in this area. For the zone of reduced runoff $h_0=0.87\ H_m-219$; for the zone of mean runoff $h_0=0.87\ H_m+31$; and for the zone of high runoff $h_0=0.87\ H_m+283$ where h_0 = mean secular value of runoff in mm and H_m = mean weighted elevation of the basin in meters. *Subject Headings:* **1. Runoff distribution with elevation 2. Transcarpathia.**—*I.L.D.*

10.6–283 551.579.1(71)

McLeod, J. D. and Clark, R. H., **The distribution and measurement of surface water in Canada.** *Royal Society of Canada, Transactions*, Ser. 3, 51(4):71–86, June **1957.** 7 figs. (incl. photos). **DLC**—A continuous long-term record of runoff from any river basin is basic to the planning of an efficient and economic development of the water resources of that basin. The authors outline the history of the organization which has been responsible for the accumulation of surface runoff data in Canada, and some of the problems encountered in the collection and compilation of these data, particularly the effects which the increased utilization of our water resources has had on the organization and planning for the inventory of these resources. Discussed also are some of the problems associated with the distribution and occurrence of precipitation and runoff in Canada and the adequacy of the available data that beset the hydrologist in planning water resource development. *Subject Headings:* **1. Surface runoff 2. Runoff data 3. Water resources 4. Canada.**—*Authors' abstract.*

10.6–284 551.579.1:627.1

Sokolov, A. A., **O normakh poter' stoka, sviazannykh s sozdaniem vodokhranilishch v razlichnykh geograficheskikh usloviiakh.** [Norms of runoff losses in relation to the establishment of reservoirs under various geographic conditions.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:17–21, **1958.** 2 figs., 7 eqs. **DWB, DLC**—An attempt to determine quantitatively the losses in runoff (difference between precipitation and rainfall, or more exactly the difference between the runoff available from an area before the construction of a reservoir and that which will be available from the same area after the construction of the reservoir) as a function of rainfall and evaporation which are elements of the water balance and hence of geographic conditions. An equation is developed for expressing runoff loss in fractions (or percent) of h, i.e., normal of annual runoff (runoff layer) as a function of p, x, z and h, namely $0h=p\left(\frac{x-z}{h}-1\right)$ where p—part of the water catchment area, z—normal of evaporation (layer) from the water surface of the reservoir, x—normal of annual precipitation (layer) on the surface of the reservoir and h—normal of annual runoff (runoff layer) into the collection point before construction of the dam. The expression $x-z/h$ is represented by the parameter K and its dependence upon geographical factors is analyzed for three characteristic cases: namely, where $x-z/h=0$ so that losses depend only upon p; $x-z/h=1$ or $x-z=h$; 1 the diminution of runoff as a result of construction of the reservoir does not occur independently of p and $x-z/h<0$ which occurs when evaporation from the water surface exceeds the annual precipitation amount. *Subject Headings:* **1. Runoff regime 2. Reservoir effect on water balance 3. Hydrologic cycle.**—*I.L.D.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Climat. res.,** 10.6–5; **Climat. texts.** (Kendrew), 10.6–9; **Climat. res. in Poland** (Pashinskiĭ), 10.6–47; **Climat. definitions** (Lydolph), 10.6–64; **Climate definitions** (Roldan Seminario), 10.6–65; **Weather effects on diseases** (Krammer), 10.6–117.

10.6–285 551.58:551

Chorley, Richard J. (*Brown Univ.*), **Climate and morphometry.** *Journal of Geolog* Chicago, 65(6):628–638, Nov. **1957.** 6 figs., 2 tables, 24 refs. **DLC**—An analysis of th morphometry of three areas (Exmoor in Devonshire, Eng.; Cameron and Potter counti of Pennsylvania; and Winston, Cullman and Lawrence counties of Alabama) of similar gro lithology, structural effect, and stage of dissection shows that there is a significant differen between each of the equivalent landscape unit forms. A climate/vegetation index (I_c) w obtained for each region, employing the mean annual rainfall, the mean monthly maximu precipitation in 24 hrs, and THORNTHWAITE's precipitation effectiveness index. It is fou that the climate/vegetation index bears a remarkably consistent relationship to the mea logarithms of stream lengths, basin areas, and drainage densities. *Subject Headings:* **1. Clima and morphometry 2. Landscape-climate relationships 3. Exmoor, Eng. 4. Pennsylvan 5. Alabama.**—*From author's abstract.*

CLIMATIC ZONES

See: **Tropical climates** (Aubert de la Rue et al.), 10.6–22; **Arctic temp. variations** (Longley), 10.6–37; **Climatic zones, Rio de Janeiro State** (Geiger), 10.6–298.

CLIMATE OF PARTICULAR PLACES

See also: **Climate of U. S. cities** (Ford), 10.6–28; **Climate, Turkey** (Küley), 10.6–118; **Climate, Belgium** (Sneyers), 10.6–120; **Climate, Japan** (Neyama), 10.6–167.

10.6–286 551.582(439.

Paszyński, Janusz, **Klimatologia w Wegierskiej Republice Ludowej.** [Climatology Hungary.] *Przegląd Geograficzny,* Warsaw, 28(2):365–370, **1956.** 4 photos. **DWB**— report on the present status of climatological studies in the Hungarian Peoples Repub with emphasis on investigations of local, or microclimate, and problems of climatologic mapping are presented by the author after a several weeks stay in Hungary in autumn 195 *Subject Headings:* **1. Climate of Hungary 2. Hungary.**—*A.M.P.*

10.6–287 551.582.1(56

†*Al-Shalash, Ali Hussain, **The climate of Iraq. 1957.** 82 p. 14 figs., 25 tables, 50 re Thesis (M.S.)—Univ. of Maryland. Mimeo. Vita preceding t-p. **DWB** (M82.1/5 A461cL)—The available data on temperature, precipitation, pressure, air masses and winds Iraq are analyzed to give a general idea of the climate of the country and a more detail picture of the climate of various localities for which data are available. The influence latitude, altitude, topography and water bodies, as well as air masses and fronts, are consider and shown on charts. Analysis of temperature and pressure data is fairly comprehensi and accompanied by tables and graphs. Data for 1875–1917 and 1923 to date are used, b during much of this time the observations were made by untrained observers. Since 19 at least 80 regular weather stations (60 for precipitation only) have been maintained by t Iraq Meteorological Service. *Subject Headings:* **1. Climate of Iraq 2. Climatic data 3. Ira** —*M.R.*

10.6–288 551.582.2(86

*Ferdon, E. N., Jr. and Bissell, Malcolm, H., **The climates of Ecuador.** *Santa Fe, N Mexico. School of American Research, Monographs,* No. 15 (their Studies in Ecuadori Geography), pub. **1950.** p. 35–79. 16 figs., tables. **DWB** (918.55 F348s)—A fairly elabora

eport on the main climatic elements in Ecuador, based on official data from 1930–34 and 1936–37, and on additional data from private oil, mining and fruit companies. Data for over 70 stations were included, but most of it is for 10 yrs or less and all parts of the country are not epresented. Monthly wind roses are presented for 8 stations, temperature graphs are shown or extreme months for 6 stations, histograms of temperature and precipitation for 36 stations, nourly rainfall distribution for 5 stations, monthly cloud frequency diagrams for 12 stations; nd data presented for 79 stations in appendix. A large beautifully colored climatic map of Ecuador based on the Köppen classification is laid in the pocket. *Subject Headings:* **1. Climate of Ecuador 2. Climatic charts 3. Ecuador.**—*M.R.*

10.6–289 551.582.2(87)

Sanchez, Carrillo, J. M., **Aspectos generales del clima en Venezuela.** [General aspects of the climate of Venezuela.] *Venezuela. Dirección de Agricultura. Div. de Extensión Agrícola, Ser. A*, No. 4, [1957?] 19 p. Mimeo. **DWB** (M82.2/87 V458as)—Since there is little (<3°C) difference in mean temperature between the warmest and coldest months of the year in Venezuela, the mean annual temperature is a good indicator of the thermal relations between regions, especially between high and low altitude stations as shown on a mean annual isotherm chart. At least 93% of the country lies below 800 m, and 1%>2000 m. The climate of each geographic region is described and the isohyetal and isothermal characteristics reviewed systematically. Finally, climate and human life or adaptation and climatic studies going on in Venezuela are reviewed. *Subject Headings:* **1. Climate of Venezuela 2. Regional climatology 3. Venezuela.**—*M.R.*

CLIMATIC CHANGES

See also: **Surface pressure distrib.** (Shapiro), 10.6–217; **Precip. singularities, China** (Kao), **10.6–269.**

10.6–290 551.583.7:551.1

†Ma, Ting-Ying H. (*Prof. Natl. Taiwan Univ.*), **Research on the past climate and continental drift, Vol. 4, The equator and the relative positions of the continents during the Cretaceous period as deduced from the distribution and growth values of reef corals.** Pub. by the author, Taipei, Taiwan, China, Aug. **1951.** 25 p. 2 figs., 77 refs. **DLC** (QC884.M25)—Evidence from cretaceous coral reefs of Africa, North America, Central and South America, Australia and the South Pacific indicates a definite drift of the continents during geologic time, sudden shifts in pole positions, and a similarity in distribution of climatic zones during the Cretaceous to that during the Ordovician, Silurian and Devonian periods of the Paleozoic. The author claims that, just because KÖPPEN and WEGENER's ideas of how the continents drifted and their estimated pole positions are refuted by later evidence, the theory of polar displacement and continental drift need not be refuted. Also warm fossils found at high latitudes do not conclusively prove a general warming all over the earth. Submarine canyons are said to be explained by the sudden shift in poles. *Subject Headings:* **1. Paleoclimatology 2. Polar displacement 3. Continental drift.**—*M.R.*

10.6–291 551.583.2(988)

Pejml, Karel, **K otázce kolísání klimatu v Gronsku v 10.–14. století.** [Climatic variations in Greenland during the 10th–14th centuries.] *Meteorologické Zprávy*, Prague, 10(6):150–153, **1957.** 17 refs. Russian and German summaries p. 150. **DWB**—The author reviews several theories dealing with the decline of the Norwegian settlements on Greenland in the 14th century, and concludes that the deterioration of living conditions was a result of the depletion of natural resources (forest and pasture) rather than of a change in climate as suggested by a number of authors. Several passages are quoted from the 13th century document **Konunugs Skuggsjá** (Speculum regale) which contains lively descriptions of conditions in Greenland. *Subject Headings:* **1. Historic climates 2. Climatic change theories 3. Greenland.**—*G.T.*

MICROCLIMATOLOGY

See also: **Weather conditioning of houses** (Conklin), 10.6–29; **Indoor climates, Belgian Congo** (Lebrun, Vander Elst), 10.6–305.

10.6–292 551.584:551.524.31:5

Cloudsley-Thompson, J. L. (*Dept. of Zoology, King's Col., Univ. of London*), **Microclimat and diurnal rhythms in terrestrial arthropoda.** *International Journal of Bioclimatology a Biometeorology*, Leiden, Vol. 1 (Pt. 3, Zoological Bioclimatology), **1957.** 2 p. 6 refs.— view of the fact that conservation of water is perhaps the major physiological problem i fluencing small land animals such as insects, a respiratory mechanism permitting gaseo exchange without excessive water loss has been evolved. Terrestrial arthropoda can divided into two main groups: those that always lose water rapidly in day air (woodli centipedes, etc.) and those with a relatively impervious integument that renders them relative independent of moist surroundings (i.e., spiders). Measurements of microclimatic conditio in the Tunisian desert have shown considerable temperature fluctuations between day a night; a few centimeters down a cricket hole there was a time lag in diurnal temperatu fluctuations. Thus insects restricted by their responses to light, moisture, etc. will emer only at night. *Subject Headings:* **1. Arthropoda microclimatology 2. Diurnal temperatu variations 3. Insect water loss.**—*I.L.D.*

10.6–293 551.584:52

Couder, André, **Les conditions micrométéorologiques de l'observation téléscopiqu tentative pour les améliorer.** [The micrometeorological conditions of telescopic observatio an attempt to improve them.] *Académie des Sciences, Paris, Comptes Rendus*, 236:780–7 Feb. 23, **1953.** Trans. into English issued by Sandia Corporation, Alburque, N. M., availab **DWB** (M5208 C854mi)—The characteristic optical homogeneity of the atmosphere and t possibility of destroying completely the natural convection by substituting a forced circulati in the telescope at Huate-Provence is investigated. The improved instrument is intend to better diminish diurnal warming up and to hasten cooling at the beginning of the nig a great help to observers. *Subject Heading:* **1. Microclimatic influences on telescopes.**—*N.*

10.6–294 551.584.4:581

*Sreeramulu, T. (*Andhra Univ. Waltair, India*), **Effect of mowing grass on the concentr tions of certain constituents of the air spora.** *Current Science*, Bangalore, 27(2):61–63, F **1958.** fig., table, 2 foot-refs. **DWB, DLC**—The report stresses the fact that noticeab changes in the air spora of an area, where grass and other weeds had been mowed down, cau some changes in the concentrations of some plant species and in the weather conditions of t area. The observations were made at the Imperial College Field Station at Sunninghill, Ber Eng. from July 19–24, 1955. To illustrate this, a chart and table are given showing the co centrations of the five spore types before, during and after mowing the grass and other wee around a smut-infected barley field. *Subject Headings:* **1. Grass microclimatology 2. Poll control.**—*N.N.*

10.6–295 551.584.41:551.588.6(4

*Baumgartner, Albert, **Beobachtungswerte und weitere Studien zum Wärme- und Wasse haushalt eines jungen Waldes.** [Observational data and further studies on the heat a moisture exchange in a young forest.] *Munich. Universität. Meteorologisches Instit Wissenschaftliche Mitteilungen*, No. 4, June **1957.** 59 p. 8 figs., 46 tables, 9 refs. **DW** (M:634.9 B348b)—A continuation of the study reported in the *Deutsch. Wetterd. Berichte*, N 28, **1956** (*see* 8D–103, April 1957, *MAB*) on the radiation, temp., relative humidity, va pressure, wind, evaporation, soil surface temp., ground temp., interception of radiation a precip. by woods, etc. for levels from 30 cm below ground to 10 to 16 m above the grou Methods are described and equipment illustrated. Besides the detailed tabulations of above data, several analyses on radiative conditions in woods and meadows, horizontal d tribution of dew on a cross section through wood and meadow, and measurement of prec retention by a forest are included. *Subject Headings:* **1. Forest micrometeorology 2. Sau lach, Munich, Bavaria.**—*M.R.*

10.6–296 551.584.9:551.586:59

Pimentel, David (*Hull Zoological Lab., Chic. Univ.*), **Alteration of microclimate imposed y populations of flour beetle (*Tribolium*).** *Ecology*, Durham, N. Carolina, 39(2):239–246, pril, **1958.** 6 figs., 7 tables, 14 refs. **DWB**—The temperature and moisture content of the icrohabitat is significantly higher than the temperature and moisture content of the habitat lone. Population density is associated with this increase in temperature and moisture. lence there remains this conclusion that microclimate has both environmental as well as opulation origin. In this article the maximum temperature increase has been measured to ss than 1°C and the relative humidity increase to about 11%. A population of 300 larvae ised the temperature 0.60°C above that of the controls and no relation was found between he biomass of the adult, pupal and larval stage and the amount of temperature increase nposed by that population. But when the temperature changes imposed by the adult opulations were followed in time, an immediate rise in temperature was noted and the maxi- um increase was reached in 24 hrs, then a general decline in temperature for 6 days. A more xhaustive study of the action of microclimate upon animal population and the reaction of the nimal population upon microclimate might yield cogent ecological information concerning he regulation of animal numbers. *Subject Headings:* **1. Biometeorology 2. Beetle micro- limates.**—*N.N.*

CLIMATIC CLASSIFICATION

See also: **Meso-climatology, Kanagawa Prefecture, Japan** (Tsuchiya), 10.6–271.

10.6–297 551.585:551.589(477)

Andrianov, M. S., **O tsirkuliatsionnykh faktorakh klimata zapadnykh oblasteĭ Uk. SSR.** Circulation factors of climate in the western regions of the Ukrainian S.S.R.] Trans. into nglish (extended summary) by I. Donehoo, from original Russian in *Lvov. Universytet, 'eograficheskiĭ Sbornik*, 18(2):63–72, **1951.** 5 p. Carbon of typescript. **DWB** (M82.1/477 .573ci)—Points out the fact that the western areas of the Ukrainian S.S.R. and most of the estern belt of central European U.S.S.R. are similar in their general conditions of atmospheric rculation and radiational regime. The Ukrainian S.S.R. is influenced by the interchanging nteraction of the Azores and the Siberian anticyclones. The characteristics of the atmospheric rculation are summarized. The complicated climatic interaction results in a moderately- ontinental climate for the region: a long spring, not too hot summer, a rather warm autumn nd a comparatively mild winter. Six pecularities in the annual frequency variation of the r mass are discussed for the region. *Subject Headings:* **1. Climate of Ukraine 2. Synoptic imatology 3. Ukrainian S.S.R.**—*N.N.*

10.6–298 551.585(81):551.581

Geiger, Pedro Pinchas, **A região setentrional da Baixada Fluminense.** [Northern part f the Baixada Fluminense.] *Revista Brasileira de Geografia*, Rio de Janeiro, 18(1):3–69, an./March **1956.** 14 figs., 57 photos, tables, 6 refs. French, Spanish, English, German and speranto summaries p. 67–69. **DWB**—The climate of the state of Rio de Janeiro according o the Köppen system of classification is described on p. 7–9, including on p. 8 a full page etailed climatic map of the region. Vegetation, physical, economic and human geographic ctors are discussed and well illustrated in the remaining sections of this major geographic udy. *Subject Headings:* **1. Climatic zones 2. Köppen's classification 3. Rio de Janeiro State), Brazil.**—*M.R.*

10.6–299 551.585:551.586:58:551.577.38

†Vernet, A. (*Prof. of Agric. Ecology at Ecole Supérieure d'Agriculture, Tunis*), **Climates and egetation.** *UNESCO Arid Zone Research*, No. 10:75–101, **1958.** 4 figs., 89 refs. **DWB, LC**—The methods of studying the inter-relationships between climate and vegetation with pecial emphasis upon arid areas are reviewed on the basis of a thorough and critical analysis recent research. The author discusses various climatic indices such as measurement of rect solar heat; measurement of evapotranspiration (DE MARTONNE, EMBERGER, THORN- HWAITE, etc.); LIVINGSTON's index; the need for differentiating climates very minutely to

single millimeters of rainfall and tenths of a degree of temperature; cultivation of Coffe Arobica in Ethiopia and Brazil, etc. The various methods of climatic classification includin their underlying principles and climatic divisions are described in detail, they include THORN THWAITE's classification; GAUSSEN's classification, which is based upon the argument that state of drought exists when the total monthly precipitation in millimeters is less than twic the mean Centigrade temperature; and EMBERGER's classification which is based upon th following key factors: existence or nonexistence of rainfall, patterns of insolation, temperatur and rainfall which identify "families of climates," and variable characteristics such as humic ity. The methods of investigating the relationship between climate and the distribution natural vegetation are discussed under these broad categories: namely, physionomical studie study of climate formations and the developmental mechanics of vegetation, and phytosocic logical studies. The interaction of climate and cultivated plant species is studied by examinin the adaptation of domesticated species to particular climatic conditions by the followin methods: determination of distribution areas, acclimatization experiments, and correlatio of yields and climatic factors. The mapping of vegetation is discussed and a vegetation ma of Tunisia is produced. *Subject Headings:* **1. Climate and vegetation 2. Climatic classificatio 3. Arid zone ecology 4. Tunisia.**—*I.L.D.*

10.6–300 551.585

†Eriksson, E., (*International Met. Inst., Stockholm*), **The chemical climate and saline soi in the arid zone.** *UNESCO Arid Zone Research*, No. 10:147–180, **1958.** 20 figs., 10 table 81 refs., 6 eqs. **DWB, DLC.** Available in mimeo. form. 65 p. 20 figs., tables, 69 ref **DWB** (M85.53 E68ch)—A comprehensive review of present knowledge of the role of th atmosphere in the circulation of sea salts, the distribution of sea salt components over co tinents and the chemical climate of arid zones. The contents of this paper comprise th following: a review of the composition of the atmosphere and precipitation; removal of chemic constituents from the air to the ground by precipitation, by absorption of gases by soil a by the infringement of particulate matter on small obstacles; the ground as a source of chemic constituents in the atmosphere including both particulate matter and gaseous compound the yearly circulation of chloride and sulphur between continents and oceans, including the production by volcanoes and weathering of igneous and sedimentary rocks, noncyclic chlori and sulphur in river water and cyclic salts; the origin and mechanism of sea spray whi distributes chlorides into the atmosphere; the vertical distribution of sea salt particles over t sea as indicated by measurements over Hawaii, Florida, Puerto Rico, and the South Seas a concentrations in tropical cyclones; the concentration of salts over continents; interacti between chloride and sulphur compounds in the atmosphere; and the transport of sea sa into arid regions, namely, Mexico and southwestern United States, arid regions of Sou America, the Sahara region south of the Sahara Desert, southwest Africa, northwest Ind Australia, arid regions of the Near East, Central Asia and in oceanic islands in the subtropic belts; chemical hydrology, and the role of atmospheric salts in soil formation. *Subject Hea ings:* **1. Arid zones 2. Chemical climatology of arid zones 2. Sea spray nuclei distributio** —*I.L.D.*

BIOCLIMATOLOGY

See also: **Medical climat. conf.** (Undt), 10.6–51; **Weather effects on asthma, Turkey** (Küley), 10.6–118; **Weather effects on blood** (McDonagh), 10.6–119; **Beetle micro-climat.** (Pimentel), 10.6–296; **Climate and vegetation, Tunisia** (Vernet), 10.6–299; **Solar influences on precip. of chemicals** (Piccardi), 10.6–302; **Physicochemical re-actions** (Piccardi), 10.6–303.

10.6–301 551.586:61

†Buskirk, Elsworth R. and Bass, David E., **Climate and exercise.** *U. S. Quartermas Research & Engineering Center, Natick, Mass. Environmental Protection Research D Technical Report*, EP-61, July **1957.** 32 p. 7 figs., 3 tables, 57 refs. **DWB** (M86 U585t) The literature on the effects of climate on man's ability to perform exercise is reviewed w special reference to the effects of hot environments. The authors discuss the physiology temperature regulations, disturbances of heat regulation during exercise, heat stress; h

regulation of the body during exercise including metabolic heat during exercise, physiological and physical factors influencing heat loss during exercise, internal body temperature during exercise and its effect on exercise and possible reasons for its toleration; the effect of environmental heat upon exercise, acclimatization to heat, the effect of special environments upon exercise, such as water upon swimming; effects of dehydration (water and salt loss) upon exercise; individual differences in heat tolerance; influence of clothing upon heat stress and heat stress indices on the basic physiological factors. Charts are presented showing the distribution of mean July wet bulb temperature (°F) in the U. S. and of average values of local room-temperature and relative humidity for the month of July in the U. S. *Subject Headings:* **1. Physiological climatology 2. Body heat loss during exercise 3. Physiological heat balance.**—*I.L.D.*

10.6–302 551.590.2:551.586

Piccardi, Giorgio, **Ein anorganischer Test für das Studium der Einflüsse atmosphärischer und kosmischer Phänomene auf physikalischchemische Prozesse.** [An inorganic test for investigating the effects of atmospheric and cosmic phenomena on physico-chemical processes.] *Wetter und Leben*, Vienna, 6(10/12):217–220, **1954.** 4 refs. **DWB**—A series of experiments was carried out on the simultaneous hydrolysis of an amount of $BiCl_3$ and an equal amount of normal and activated water (containing a melted glass bead enclosing a drop of mercury and neon under reduced pressure). The percent of sedimentation both indoors and outdoors during 1951–1954 diminished parallel to the diminutions in solar activity. A regularly recurring maximum of percent of sedimentation was found at end of winter in case of a metal free space and a minimum in a space enclosed with copper sheathing. Also small variations of slight duration were observed. *Subject Headings:* **1. Solar influences on precipitation of chemicals 2. Physico-chemical processes 3. Bismuth oxychloride precipitation.**—*I.L.D.*

10.6–303 551.590.2:551.586:612.11

Piccardi, G., **L'influence des phénomènes terrestres solaires et cosmiques sur les réactions physico-chimiques et biologiques.** [Influence of terrestrial, solar and cosmic phenomena on physico-chemical and biological reactions.] *Ciel et Terre*, Brussels, 72(5/6):227–244, May/June **1956.** 6 figs. **DWB**—A report on systematic experiments at Florence since 1951 and at Brussels, Vienna and Kaprun Mooserboden (Hohe Tauern) since 1952, 1953 and 1954, respectively to determine the effect of cosmic or solar radiations or electromagnetic fields on colloidal or biological substances in the laboratory under controlled conditions. Graphical correlations are presented to show results in enclosed or nonenclosed chambers. *Subject Headings:* **1. Biometeorological experiments 2. Solar influences on physico-chemical reactions 3. Florence, Italy.**—*M.R.*

10.6–304 551.586:612.11

Giordano, Antonio, **Il test P in biologia: La eritrosedimentazione differenziata.** [The P-test in biology: the differential sedimentation of erythrocytes.] *Geofisica e Meteorologia*, Genoa, 5(3/4):51–54, May/Aug. **1957.** 2 figs., 15 refs. **DWB, DLC**—A detailed description is given of the P-test of G. Piccardi (*see* 9.7–256, July 1958, *MAB*) which involves a study of the precipitation of bismuth oxychloride under a copper shield (D-test) and outside a copper shield (F-test). The P-test has been applied to the coagulation, agglutination and ratio of sedimentation of erythrocytes. The results of experiments in which blood samples to which sodium citrate has been added were placed in a container and kept in the open air, but wrapped in black paper and in a closed container under a copper screen, are presented and discussed. The experiments made with blood of healthy and sick persons and of various animals (chickens, dogs, cows, etc.) showed the following results. In the presence of strong SW wind, the sedimentation rate under copper (*D*) and in the open air (*F*) differed considerably, while in the former sedimentation was normal, in the latter, it was so rapid that it could hardly be calculated. In stable weather the sedimentation rates were similar. *Subject Headings:* **1. Bismuth oxychloride precipitation 2. P-test 3. Sedimentation of erythrocytes.**—*I.L.D.*

10.6–305 551.586:551.584.61:612.014.43(67

†Lebrun, A. and Vander Elst, N., **Le climat et l'habitation au Congo belge.** [Climate a housing in Belgian Congo.] *Acàdémie Royale des Sciences Coloniales, Classe des Scien Techniques, Mémoires, Nouvelle Série*, 8(4), **1958.** 51 pages, 2 tables, 21 refs.—The autho have brought together the numerous, peculiar technical aspects of the problem of housi climate in hot countries. The first part (Ch. II and III) gives the physical and physiologi factors to be taken into account in building climatology. The immediate or long-term effe of excessive temperature on the health, the morale, the productive activity of man and on t ability to maintain acquired habits and qualities are pointed out. The second part (Ch. I discusses the deferred consequences of an impeded or insufficient thermoregulation of t human organism. In Ch. V are collected data of reference and various remarks on the pr tection against hot weather and the improvements which can be provided to the health or t output of man through the cooling of the atmosphere. The aim of the authors is to supp architects, town-planners, hygienists and everyone interested in these questions with a wo of reference. *Subject Headings:* **1. Indoor climates 2. Tropical housing 3. Heat effects man 4. Belgian Congo.**—*A.V.*

UPPER AIR CLIMATOLOGY

See: **Upper air climat., U. S.** (Ratner), 10.6–18.

ENVIRONMENTAL INFLUENCES

See: **Topographic influences on atmos. circulation, China** (Yeh, Koo), 10.6–184.

SYNOPTIC CLIMATOLOGY

See: **Climat. of grosswetterlagen, Germany** (Bürger), 10.6–13; **Synoptic climat., U.S.S.R.** (Vangengeĭm), 10.6–14; **Monsoon circulation theories, Asia** (Flohn), 10.6–224; **Circulation factors of climate, Ukraine** (Andrianov), 10.6–297.

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Night airglow** (Bagariatskiĭ), 10.6–202.

10.6–306 551.590.21:551.577:523.7

*Roldan Seminario, Ernesto and Vallejo E. S., **Las manchas solares y la lluvia.** [Su spots and rainfall.] *Revista Meteorológica del Perú*, Lima, 2(3):29–36, Oct./Dec. **1956.** table graphs. **DWB**—A highly detailed statistical study of annual precip. records for (A) Caj marca, (B) Huancayo and (C) Puno, Peru (1922–55) to show the relation between sunsp cycles and precip. for (A) $\gamma_t = .425$, for (B) .337 and for (C) .396. *Subject Headings:* **1. Su spot effects on rainfall 2. Solar-weather relationships 3. Huancayo, Peru.**—*M.R.*

10.6–307 551.590.24:551.521.

Kocyan, Irena; Zbiegień, Jadwiga; Ogiński, Andrzej and Wiecha, Damian, **Wyni badań dotyczących odczynu Takaty wykonanych w Suwałkach podczas zaćmienia Słoń dnia 30 czerwca 1954 r.** [Results of observations of the Takata reaction made at Suwal during the June 30, 1954 solar eclipse.] *Przegląd Geofizyczny*, Warsaw, 2(3):121–136, 195 5 figs. (incl. map), table, 12 refs., eqs. French summary p. 136. **DWB, DLC**—The obje of this paper is to determine if a modification of the number of flocculations (F) has tak place during the total solar eclipse observed at Suwalki, June 30, 1954 similar to those observ by TAKATA at Kushiro during the eclipse of Feb. 5, 1943. A statistical examination of t relationship between the values of F and the solar effect does not prove the existence of relationship between the number of flocculations and solar radiation. *Subject Heading* **1. Takata reaction 2. Eclipse effects on flocculations 3. Solar eclipse, June 30, 1954 4. S walki, Poland.**—*A.M.P.*

10.6–308 551.590.25:621.396.9

Endresen, K.; Hagfors, T.; Landmark, B. and Rödsrud, J. (*all, Norwegian Defence Res. Establishment, Kjeller, Norway*), **Observations of angle of arrival of meteor echoes in v.h.f. forward scatter propagation.** *Journal of Atmospheric and Terrestrial Physics*, N. Y., 12(4):329–334, 1958. 5 figs., 8 refs. **DLC**—Observations of the azimuth angle of arrival of meteor reflections in forward scattering are presented. The properties of background meteor as well as shower meteor reflections are studied. The diurnal variation of the angle of arrival of the meteoric reflections is in good agreement with present theories. *Subject Heading:* **1. Angle of arrival of meteor echoes.**—*Authors' abstract.*

VISIBILITY

See also: **Air flow types, San Francisco Bay area** (Smalley), 10.6–223.

10.6–309 551.591:551.575:551.521.13

Eldridge, Ralph G. and Johnson, John C. (*both, Technical Operations, Inc., Burlington, Mass.*), **Diffuse transmission through real atmospheres.** *Optical Society of America, Journal*, 48(7):463–468, July 1958. 10 figs., 2 tables, 11 refs., eqs. **DWB, DLC**—Diffuse transmission through atmospheres of haze and clouds were measured over slant ranges from 0.5 to 9.0 kilometers, in Maine and Massachusetts. The modification of the transmissions when the source was near a diffusely reflecting surface was also measured. The transmissions are presented as curves representing the least squares fit to the experimental data for general weather conditions. *Subject Headings:* **1. Atmospheric transmission 2. Diffusion by fog 3. Diffuse reflectance measurements.**—*Authors' abstract.*

10.6–310 551.591:535.7

Haig, T. O. and Morton, W. O., III, **An operational system to measure, compute and present approach visibility information.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics, No. 102*, June 1958. p. 1–60. 13+21 figs., 4+1 tables, 15 refs., 21 eqs. **DWB, DLC**—The history and major efforts of the Approach Visibility Project (ANDB) are reviewed briefly. The development of a simplified system to determine visual contact height is discussed in detail. The use of this information in military and civil air operations is discussed, and instructions for implementing the system on an interim basis are presented. *Subject Headings:* **1. Approach Visibility Project 2. Visibility 3. Visual acuity.**—*Authors' abstract.*

10.6–311 551.591:551.575:551.521.13

Olivier, J., **La visibilité des sources lumineuses dans le brouillard: effet des luminances de la lumière naturelle.** [The visibility of beacon-lights in fog: natural light luminance effect.] *Revue d'Optique*, Paris, 36(3):105–131, March 1957. 28 figs., 9 refs., eqs. **DLC**—To determine the visibility of the beacon-lights used for the landing of aircraft in fog, the author studied the background luminance due to the diffusion of natural light by fog. He recalls the fundamental equation and its numerical solution; he gives results for the diffused radiation and a first approximation to the results for direct solar radiation, obtained by CHANDRASHEKHAR, as applied by LENOBLE. For this method, he gives a calculation, valid for the upper part of the fog layer, which corrects the error due to the incorrect representation of the light diffused in a forward direction, and he discusses qualitatively the importance of this error at any point. It is thus shown that this calculation is valid as a first approximation for various important applications, which he examines: energy transmission by a diffusing layer, luminance and albedo of a diffusing layer and of the clouds, determination of the oblique visibility for aviation purposes. *Subject Headings:* **1. Visibility in fog 2. Diffusion by fog.**—*Author's abstract.*

OPTICAL PHENOMENA

10.6–312 535.4:551.593.1:551.576(729.6)

*Braham, Roscoe R., Jr. and Harrington, Edward L., **Cloud refractive index studies, Pt. 1, Gradient distributions.** Chicago. Univ. Dept. of Meteorology, Cloud Physics Lab.

Contract AF(604)-1931, Technical Note, No. 11, March 24, 1958. 37 p. 24 figs., numerou tables, 3 refs.—A study has been made of the small-scale gradients of refractive index foun within and around a group of 71 cumulus clouds studied June 15 and 19, 1956 in the vicinit of the Bahama Islands. Data were obtained with a Univ. of Texas microwave refractomete mounted in an Air Force B-29. These flights were a part of the Air Force Geophysics Researc Directorate program of refractive index studies. The magnitude of the refractive inde gradients and the space distances over which they extended were evaluated for approximatel 80,000 gradients. These are analyzed in terms of the altitudes of measurements and location with respect to cumulus clouds. An attempt has been made to study the moisture condition at cloud boundaries through an interpretation of the refractive index data obtained. It i shown that the small-scale gradients of refractive index around cumulus clouds are a functio of height and position within or about the clouds. In general the gradients reach their max mum intensity near the cloud base and in the turbulent zone near the cloud edges. *Subje Headings:* **1. Refractive index gradients 2. Cloud refractive index 3. Cumulus cloud 4. Bahama Islands.**—*Authors' abstract.*

10.6–313 52:551.593.1

Keller, Geoffrey (*Perkins Obs., Delaware, Ohio*), **Astronomical seeing and scintillation** *Smithsonian Contributions to Astrophysics*, Wash., D. C., 1(1):9–11, **1956.** 13 refs. **DLC**— Different research scientists are quoted for their achievements in the development of optica instruments for astronomical observations, although perfection has not been reached. Astro nomical seeing and scintillation have become very important but only a few observatories in th U. S. and abroad are making studies of this nature. The author hopes that some addition astronomers can be persuaded to become interested in the subject by reading of these ne developments in astronomy instruments. *Subject Headings:* **1. Astronomic meteorolog 2. Scintillation.**—*N.N.*

10.6–314 551.593.5

Green flash in the South Pacific Ocean and in the North Atlantic Ocean. *Marine Ob server*, London, 28(180):76–77, April **1958. DLC**—On April 12, 1957 at 0053 GMT, the gree flash was observed. There was no abnormal refraction, but there was a more striking serie of color changes than is normally observed. The ship was at 15°52′S, 104°50′W. *Subje Headings:* **1. Green flash 2. South Pacific Ocean 3. North Atlantic Ocean.**—*N.N.*

10.6–315 551.521.17:551.593.53:523.7

Sekihara, Kyo, **A study of the distribution of ultraviolet sky radiation during the sola eclipse.** *Tateno, Japan. Aerological Observatory, Journal*, 5(2):143–155, Jan. **1953.** 4 figs 4 tables, 13 refs. In Japanese; English summary p. 143. **DWB**—Theoretical values o intensity distribution of ultraviolet sky radiation (including primary and secondary scattering are computed on the basis of analytical expressions derived from the geometry of a parti solar eclipse. The obtained values are compared with those measured on Rebun Island durin the eclipse of May 9, 1948. The agreement between theoretical and measured quantities found to be insufficient even though polarization is taken into account. The author believe that the agreement could be improved by considering light of higher than second-order scatte ing. *Subject Headings:* **1. Ultraviolet radiation 2. Sky radiation 3. Solar eclipses 4. Rebu Island, Japan.**—*G.T.*

10.6–316 551.593.5

Toolin, Robert B. and Stakutis, Vincent J. (*both, G.R.D., A. F. Camb. Res. Center, Mass.*) **Qualitative indication of nadir sky blue.** *Optical Society of America, Journal*, 48(1):71–7 Jan. **1958.** fig., table, ref. **DWB, DLC**—Measurements made with a balloon-borne spect graph show that the radiation from the ground and the lower sky varies with altitude an terrain. The radiation curves above an area of low reflectance showed a depression, th emphasizing the fact that an image-forming, ground-reflected light penetrates strongly to th highest altitudes of the flight, although affected by attenuation and the addition of air ligh The paper gives a compilation of the ratios of the reflected relative intensities of light of 6700

o light of shorter wave lengths for several altitudes. *Subject Headings:* **1. Sky light colors 2. Spectral reflectivity.**—*N.N.*

10.6–317 551.593.63:523.746

*Chernov, V. M. and Chistiakov, V. F., **Halos and the general circulation of the atmosphere.** Trans. of original Russian in *Vsesoiuznoe Astronomo-Geodezicheskoe Obshchestvo, Biulletin'*, No. 19:31–35, Sept. **1956.** 2 figs., 11 refs. (original available **DLC,** QB1.V752). Trans. (9 p. typescript) available **DWB** (M93.63 C521La)—Halo frequency records for 8 stations in the U.S.S.R. and for a dozen in other countries (at various latitudes from 60°N to 26°S, and for period 1909–1952 or less), show values ranging from 2.6 per year at Luanda to 119.3 at Moscow with a marked latitudinal correlation (high values at high latitudes and vice versa) and a variable correlation with solar activity—high positive correlation in high latitudes and negative correlations in low latitudes. Differences are interpreted as being due to increase of circulation during periods of high solar activity—hence increase in water evaporation transported to high latitudes and thus more ice particles at high levels. *Subject Headings:* **1. Halo frequency relationships 2. Halo-solar activity relationships.**—*M.R.*

ELECTRICAL PHENOMENA

See also: **IGY Aurora program** (Chapman), 10.6–34; **Lightning discharges and damage to aircraft** (Faucher, Curtis), 10.6–95; **Convective cloud electrification** (Vonnegut, Moore), 10.6–160; **Ionospheric electron density computation** (Duncan), 10.6–173; **Cloud droplet size data and elect. charges on drops** (Phillips, Kinzer), 10.6–251; **Elect. charges on droplets from bursting bubbles** (Blanchard), 10.6–252.

10.6–318 551.594.1:551.501(494)

Dolezalek, H., **Examples for a synoptical evaluation of the measuring results of four atmospheric electric stations in Switzerland.** Germany, Deutscher Wetterdienst (Meteorological Observatory, Aachen,) Contract AF 61(514)-640, Technical Note No. 16, Aug. 15, **1957.** 31 p. 4 figs., tables, refs. **DWB**—The author reports some initial results in the new field of systematic atmospheric electric synopsis by means of the empirical data of the "Alps Project." First the foundation of the synoptic work in atmospheric electricity and the results to be expected are discussed. Some examples are chosen to illustrate the possibilities of this method and consequences for atmospheric electric synoptic measuring programs are deducted from it. *Subject Headings:* **1. Atmospheric electricity networks 2. Synoptic observation of atmospheric electricity 3. Switzerland.**—*Author's abstract.*

10.6–319 551.594.12:551.553.11

Kotsev, V., **Vŭrkhu niakoi osobenosti na vŭzdushnata ionizatsiia pri briza.** [Peculiarities of atmospheric ionization during breezes.] *Khidrologiia i Meteorologiia*, Sofia, No. 3:8–19, **1956.** 8 figs., table, 3 refs. English and Russian summaries p. 18–19. **DLC**—This article gives the results of the measurement of air ionization under seashore conditions. In case of a pronounced breeze, an increase of general ionization is observed in most cases. The preponderance of negative ionization is likewise observed. One of the explanations of this fact is the Lenard effect, but the author believes that another possible cause may be the circular character of the breeze circulation. Due to the cathode effect there is a possibility that the negative ions which are found at higher altitude and predominate over the positive ones, are carried by air currents to near ground layers. The author suggests that, if these peculiarities of ionization are a result of the circular circulation, then the same effect should be observed in mountain breezes. *Subject Headings:* **1. Ionization during breezes 2. Land and sea breezes.**—*Author's abstract.*

10.6–320 551.594.13:551.510.535

Kamiyama, Hiroshi and Sato, Teruyuki (*both, Geophysical Inst., Tohoku Univ.*), **The distribution of the electrical conductivity in the ionosphere and its variations.** *Tohoku University, Science Reports, Fifth Series, Geophysics*, 9(2):55–80, Oct. **1957.** 19 figs., 2 tables, 27 refs., 43 eqs. **DWB, DLC**—The ionospheric conductivity is estimated on the basis of the

atmospheric model derived from rocket data. The collisional frequency with which th conductivity is closely related depends not only on the density and the temperature of th atmosphere but also on the concentrations of the electrons and ions. The dependency i examined at various altitudes. Consequently, the conductivities longitudinal and transversi to the earth's magnetic field, and the Hall conductivity are evaluated for various values o electron concentration. These results are applied to the vertical and geographical distribu tions of the conductivities and their daily, seasonal and sunspot-cycle variations. The con ductivity is almost proportional to the electron concentration except in the lower E regio and in the F region. In the F region, it is more sensitive to the electron concentration tha in the lower region. *Subject Headings:* **1. Ionospheric conductivity 2. Ion concentratio 3. Electron concentration.**—*Authors' abstract.*

10.6–321 551.594.2:551.51

Dolezalek, H., **Remarks on the electrical conditions during disturbed weather.** Germany Deutscher Wetterdienst (Meteorological Observatory, Aachen), Contract AF 61(514)-64(Technical Note No. 12, Aug. 25, **1957.** 28 p. fig., tables, 13 refs. **DWB**—A report on result of the "Alps Project 1954/55" that are intended to promote an atmospheric electricity durin disturbed weather. No study is made of the various electric processes involved in the loca generators of bad weather, but there is information along such lines, and these were observe incidentally during the investigation. The paper covers: experiences related with thunde storms, spark discharges, precipitation, and significant remarks on the types of fogs aroun the station Jungfraujoch-Sphinx. *Subject Headings:* **1. Atmospheric electricity of disturbe weather 2. Weather effects on atmospheric electricity.**—*N.N.*

10.6–322 551.594.2

†Müller-Hillebrand, D., **Zur Frage des Ursprunges der Gewitterelektrizität.** [Proble of the origin of thunderstorm electricity.] *Arkiv for Geofysik*, 2(18):395–416, **1957.** 11 figs 5 tables, 27 refs., 6 eqs. **DLC**—Most theories concerning thunderstorm electricity fail compared with actual measurements. An idealized distribution scheme of electric charge in a thunderstorm cloud is proposed. A positive field of IV/cm can develop in a few minute with a precipitation intensity of 10 mm/hr. The electric influence process is enhanced a temperatures below −20°C. The effect of different kinds of precipitation is analyzed. Som results of measurements are communicated, and detection by radar is mentioned briefly *Subject Headings:* **1. Thunderstorm electricity 2. Cloud physics.**—*A.A.*

10.6–323 551.594.221(26

Rare form of lightning in the South Pacific Ocean. *Marine Observer*, London, 28(180):74 75, April **1958. DLC**—The captain of the "M.V. Cumberland" gives a description of th unusual lightning phenomena observed in the South Pacific Ocean. In one case the lightnin did not flash but seemed rather to hang between the cloud and the sea for a perceptible interva of time. In another, the flash appeared to form slowly as it rose into the sky. *Subject Head ings:* **1. Lightning forms 2. South Pacific Ocean.**—*N.N.*

10.6–324 551.594.25:551.574.

Mühleisen, R., **Elektrische Ladungen auf Kondensationskernen bei der Wasseraufnahm und -abgabe.** [Electrical charges of condensation nuclei on moistening and drying.] *Natu wissenschaften*, Berlin, 45(2):34–35, Jan. 15, **1958.** fig., 5 refs. **DLC**—Controlled experiment in a closed 400 cm^3 chamber showed that the density of the electrical space charges assume negative values up to 1300 e/cm^3 during the humidification of condensation nuclei (by evapora ing water) and slowly decreases to zero after the evaporation ceases and the nuclei lose wate The charges rapidly reach positive values up to almost 1300 e/cm^3 if the drying is accelerate by space heaters. The effect is especially pronounced if smoke is created. The results ar compared with phenomena observed in the field. *Subject Headings:* **1. Condensation nucle 2. Atmospheric electricity.**—*A.A.*

AURORAS

See also: **Auroral-magnetic relationships** (Coulomb), 10.6–80; **Radar auroral echoes, Adelaide** (Weiss, Smith), 10.6–127; **Night airglow and auroras** (Bagariatskiĭ), 10.6–202; **Airglow and auroras** (Meinel), 10.6–204.

10.6–325 551.594.51:546.11:550.385

Fan, C. Y., **Time variation of the intensity of auroral hydrogen emission and the magnetic disturbance.** *Astrophysical Journal*, Chic., 128(2):420–427, Sept. **1958.** 3 figs., table, 21 refs., 5 eqs. **DLC**—The time variation in the intensity of auroral hydrogen emission and the magnetic disturbance were simultaneously recorded for a number of cases at the Yerkes Observatory. It was found that the horizontal component of the terrestrial magnetic field increases prior to the appearance of an auroral arc and that the onset of a negative bay in the disturbance coincides with the breakup of the arc to rays and an abrupt decrease in the intensity of the hydrogen emission. These observations suggest that there are two current systems—one responsible for the acceleration of auroral protons and electrons for the excitation of auroral arcs, and the other for the acceleration of auroral electrons for the excitation of auroral displays of more active types. *Subject Headings:* **1. Auroral hydrogen lines 2. Auroral-geomagnetic relationships.**—*Author's abstract.*

10.6–326 551.594.52:535.33

Harang, Leiv, **Height distribution of the red auroral line in polar aurorae.** *Geofysiske Publikasjoner*, Oslo, 20(5), **1957.** 9 p. 6 figs. (incl. photo), 5 refs., 2 eqs. **DLC**—Luminosity curves along vertical cross sections of auroral forms have been recorded by means of a photoelectric photometer of the lines 6300, 5577 and the band 4278. The intensity of 6300 shows a considerably slower decrease with height than the green line and the violet band. The character of the luminosity curves is demonstrated for various auroral forms. The effect is explained as due to a decrease in deactivation with height of the long-lived D-state of the O-atom. *Subject Headings:* **1. Auroral height distribution 2. Auroral spectra.**—*Author's abstract.*

10.6–327 551.594.52:550.385

Romick, G. J. and Elvey, C. T. (*both, Geophysical Inst., Alaska Univ. College*), **Variations in the intensity of the hydrogen emission line Hβ during auroral activity.** *Journal of Atmospheric and Terrestrial Physics*, N. Y., 12(4):283–287, **1958.** 2 figs. (incl. photo), 7 refs. **DLC**—Through the qualitative analysis of the auroral spectrum incident from the magnetic zenith, the variation of the estimated intensity with time has been obtained for Hβ (4863 Å) and the 4709 Å line of N_2+. The results show that the peak in intensity of Hβ precedes that of the 4709 Å line by 1–4 hr, and that the period in which the intensity of Hβ peaks occurs when quiet forms of the aurora are present. This same period is associated with low amplitude low frequency fluctuations of N-S earth potential. The overall earth potential fluctuation is highly correlated with the intensity variations of the 4709 Å line of N_2+ and with the type of aurora present at the zenith. *Subject Headings:* **1. Auroral intensity variations 2. Auroral-geomagnetic relationships.**—*Authors' abstract.*

PART II. ANNOTATED BIBLIOGRAPHY ON OZONE IN THE ATMOSPHERE (1954–1959)

By: *Mary L. Rice and Geza Thuronyi*

INTRODUCTION

The first part of this bibliography (covering the literature through 1953) was published in t
May issue of *MAB*. This second part covers the period from 1954 to date.

The subject outline below includes reference to items in the first part (numbers in parenthese
This bibliography was prepared for and with support from the U. S. Weather Bureau.

OUTLINE OF CONTENTS

SUBJECT OUTLINE

Comprehensive Works
- Textbooks and Technical Books, (10E–37, –56, –95, –114)
- Kondrat'ev (1956), **10F–70**
- Khrgian (1958), **10F–142**
- Massey and Boyd (1958), **10F–161**
- Monographs, Extensive Reports and Major Articles, (10E–9, –14, –15, –26, –29, –30, –41, –42, –53, –63, –74, –83, –91, –113)
- Regener [Univ. of New Mexico] (1954), **10F–19**
- Teichert (1955), **10F–44**
- Khvostikov (1956), **10F–69**
- Link (1956), **10F–72**
- Martin, D. W. [M.I.T.] (1956), **10F–77**
- Ramanathan (1956), **10F–80**
- Martin, C. D. (1957), **10F–106**
- Paetzold and Regener (1957), **10F–112**
- Concise General Discussions, **10F–15, –20, –141,** (10E–105, –119, –123)
- Bibliographies, **10F–46, –69, –106,** (10E–15, –30, –48, –53, –56, –83, –95, –114, –123)
- Conferences, (10E–13, –24, –48, –139, –140)
- Rome (Sept. 1954), **10F–51**
- Los Angeles (Feb. 1956), **10F–52**
- Ravensburg (Oct. 1956), **10F–71**

Instruments, methods, networks
- General, **10F–34, –85, –101,** (10E–63, –95, –140)
- IGY Networks, **10F–71, –111, –138, –150**
- Chemical Methods, **10F–51, –81, –84, –85, –121, –135,** (10E–21, –108, –110, –115, –128, –132)
- Potassium iodide reaction, **10F–9, –21, –44,** (10E–1, –79, –88, –103, –106, –126, –128, –149)
- Fluorescein, (10E–25, –160)
- Arsenite, (10E–74)
- Phenolphthalin, **10F–137**
- Silica gel, **10F–74,** (10E–128)
- Electrometric method, (10E–121)
- Absorption tube method, (10E–76)
- Automatic recording devices, **10F–117, –1 –156,** (10E–75)
- Rubber cracking, **10F–1, –52, –64, –** (10E–120)

Spectral Analysis
- Spectrophotography, (10E–8, –25, –35, – –99)
- Dobson spectrophotometer, **10F–28, – –92, –94, –122, –146**
- Dobson spectrophotometer as modified Moscow University, **10F–104, 10F–1**
- Portable spectrophotometer, (10E–133)
- Borman Eng. Co. ozone spectromet **10F–42**
- Quartz spectrograph, (10E–102, –129)
- High resolution grating spectrometer, (10 91)
- VODARO (ERTOR) method, **10F–30, – –55 to –58, –60, –131**
- Emission spectrum measurement, **10F– –136**
- Umkehr effect, **10F–2, –96, –115, –1 –130,** (10E–16, –59)
- In visible spectrum, **10F–105**
- Measurement of scattered sunlight, 10 129
- Accounting for secondary scatteri (10E–122, –140)
- Evaluation by means of electronic co puters, **10F–93**
- Photoelectric Meters, **10F–22, –47, – –68, –94, –164,** (10E–104, –159)
- Actinometers, **10F–65**
- Pyrgeometers, (10E–86)

Air-borne Instruments
- Balloon-borne spectrographs, **10F–38, –1 –158,** (10E–26, –34, –63, –69, –97)

Ozone radiosonde (ozonesonde), **10F–103, –109, –116, –152** (10E–46, –98, –144, –145, –147)
Balloon-borne air sampling device, **10F–91,** (10E–62)
Aircraft measurements, **10F–9, –51, –53,** (10E–75)
Rocket measurements, **10F–7, –8, –11, –128,** (10E–84, –111, –129)
Satellite measurements, **10F–167**
LUNAR ECLIPSE MEASUREMENTS, **10F–24, –29, –72, –126,** (10E–44, –45, –50, –92, –93, –117, –118)
ACCOUNTING FOR ATTENUATION BY AEROSOLS, **10F–94, –96**
Results of measurements
COMPREHENSIVE DATA, (10E–9, –24, –42, –48, –56, –95)
REDUCED THICKNESS, **10F–3, –16, –76,** –122, **–139, –147, –148,** (10E–109, –127)
In Arctic, **10F–53,** (10E–22, –71, –140)
Latitudinal distribution, **10F–18,** (10E–87, –151)
Seasonal variation, **10F–10, –13, –18, –28, –51, –68, –99, –110,** (10E–20, –28, –33, –52, –57, –64, –71, –112, –143)
Diurnal variation, **10F–51, –99,** (10E–112, –153)
VERTICAL DISTRIBUTION, **10F–8, –17, –20, –28, –29, –36, –38, –58, –62, –128, –139, –148, –158, –165, –167,** (10E–19, –23, –25 to –27, –30, –34, –35, –41, –49, –50, –59, –63, –64, –67, –69, –84, –93, –97, –111, –122, –140)
Latitudinal distribution, **10F–97, –108, –111,** (10E–117, –118, –143, –154)
Seasonal variation, **10F–97, –108, –111**
AMOUNT IN TROPOSPHERE. **10F–136, –141**
SURFACE CONCENTRATION, **10F–32, –44, –45, –50, –83, –100, –117, –123,** (10E–32, –39, –63, –140, –162)
In Arctic, (10E–21, –74, –101)
In polluted city areas, **10F–31, –33, –42, –52,** (10E–103, –106)
Seasonal variation, **10F–88,** (10E–82)
HEIGHT OF OZONE LAYER, **10F–5, –36, –61, –89,** (10E–8, –11, –44, –49)
OZONE SPECTRUM, **10F–4**
Ultraviolet, **10F–98, –163,** (10E–2, –4 to –7, –35, –36, –66, –138, –143)
Visible, **10F–26, –105,** (10E–3, –137, –143)
Infrared, **10F–25, –50, –70, –90, –107, –127, –157, –162,** (10E–80, –91, –134, –142, –143, –158)
Rotational analysis, **10F–67, –78, –86, –89, –154**
OZONE DECOMPOSITION, (10E–130, –136, –162)
Factors affecting ozone
METEOROLOGICAL FACTORS, **10F–13, –35, –44, –57, –114, 10F–168** (10E–9, –31, –54, –65, –95, –140)
Photochemical reactions in upper atmosphere, **10F–11, –54, –66, –77, –132,** (10E–14, –27 –17, –38, –40, –42, –60, –61, –77, –140, –150, –152)
Photochemical reactions in urban air, **10F–6, –31, –43, –52, –63, –64, –73, –75, –143,** (10E–130, –162)
Tropopause height, **10F–35, –62, –140,** (10E–10, –18, –40, –41, –70, –148, –154)
Pressure, **10F–162,** (10E–39, –135)
Air masses, (10E–65, –82, –116, –135)
Frontal passages, **10F–21, –44, –151**
General circulation, **10F–62, –80, –102, –140, –149,** (10E–113)
Meridional flow, (10E–87, –96)
Monsoon circulation, (10E–28)
Air movements, **10F–17, –27, –54, –77, –83, –110,** (10E–27, –32, –42, –100, –116, –124, –148, –162)
Vertical motion, **10F–20, –38, –111, –113, –118,** (10E–68, –89, –149, –155)
Turbulent transfer, **10F–20, –88, –117, –135,** (10E–85, –90, –96, –125, –150, –151)
Radiation, **10F–44**
Temperature, **10F–44, –45, –110, –140,** (10E–55)
Inversions, **10F–44, –83**
Humidity, **10F–45,** (10E–90, –146, –149, –156, –162)
Cloudiness, (10E–20, –90, –124, –130)
Fog, (10E–32, –107, –156)
Föhn, **10F–37,** (10E–32, –135, –156)
Atmospheric electricity, **10F–21, –44, –100**
Thunderstorms, **10F–23, –125,** (10E–107)
SOLAR ACTIVITY, **10F–48,** (10E–9, –12, –94)
SOLAR ECLIPSES, **10F–49,** –59, –95, –146, –160
IONOSPHERIC DISTURBANCES, (10E–81, –94, –140)
GEOMAGNETIC VARIATIONS, **10F–12**
Ozone effects
OZONOSPHERE TEMPERATURE, **10F–10, –14, –27, –39 to –41, –57, –133, –134, –153,** (10E–43, –47, –71 to –73, –78, –125, –140 to –142, –161)
TURBULENCE ABOVE OZONE LAYER, **10F–87**
COLOR OF SKY, (10E–4, –137)
IONOSPHERIC IONIZATION (as affected by ozone shadow), (10E–45)
BALLOON RUBBER DAMAGE, **10F–159,** (10E–70)
HEALTH EFFECTS, **10F–33,** –145, –165
TOBACCO LEAF INJURY, **10F–155**
Applications
STUDY OF ATMOSPHERIC CIRCULATION, (10E–58, –131, –157)
CALCULATION OF THE HEIGHT OF THE SODIUM D-LINE, (10E–45)
CALCULATION OF GLOBAL RADIATION, 10F–166

GEOGRAPHICAL OUTLINE

Arctic, 10F–53, –149
- SPITSBERGEN
  - Longyear, 10F–16, –36

Asia
- AFGHANISTAN
  - Kabul, 10F–10
- INDIA
  - Gulmarg, 10F–76
  - Mount Abu, 10F–76, –80
  - New Delhi, 10F–76
  - Poona, 10F–14
- JAPAN, 10F–139
  - Mt. Fuji, 10F–21
  - Mt. Norikura, 10F–163
  - Tateno, 10F–99, –101, –110, –122, –138, –147, –148, –160
  - Tokyo, 10F–13, –68, –102
- PAKISTAN
  - Quetta, 10F–59
- U.S.S.R.
  - Kazakhstan
    - Alma-Ata, 10F–2, –27

Australasia
- NEW ZEALAND
  - Wellington, 10F–3

Europe
- AUSTRIA
  - Zugspitze, 10F–37, –39
- GERMANY
  - Fichtelberg, 10F–32, –88
  - Lindenberg, 10F–45
  - Ravensburg, 10F–71
  - Wahnsdorf, 10F–32, –44, –88
  - Weissenau, 10F–17, –38, –111, –113, –114, –162
- GREAT BRITAIN
  - England
    - Ascot, 10F–136
    - Cambridge, 10F–5, –89
    - Farnborough, 10F–9
    - Oxford, 10F–5
- NORWAY
  - Tromsö, 10F–12, –16, –35, –91, –111, –14
- SWEDEN
  - Uppsala, 10F–146
- SWITZERLAND
  - Alps, 10F–100
  - Arosa, 10F–93
  - Jungfraujoch, 10F–151
- U.S.S.R.
  - Elbrus, 10F–94
  - Leningrad, 10F–94, –95
  - Lower Volga, 10F–168
  - Moscow, 10F–104

North America
- CANADA
  - Alberta
    - Edmonton, 10F–62
- UNITED STATES
  - Alaska
    - College, 10F–28, –119
  - Arizona
    - Flagstaff, 10F–56, –58, –97
  - California
    - Los Angeles, 10F–6, –19, –42, –52, –73, –74, –85, –124
  - Nebraska
    - O'Neill, 10F–117
  - New Mexico, 10F–8, –19, –118
    - Albuquerque, 10F–116
    - Sacramento Peak, 10F–50
    - White Sands, 10F–7
  - North Dakota
    - Bismarck, 10F–62

1954

10F–1 551.510.42:546.214 551.508.9

Beatty, J. R. and Juve, A. E., **A simple objective method for estimating low concentrations ozone in air.** *Rubber World*, 131(2):232–238, Nov. **1954.** 17 figs. **DLC**—A simple, accurate a objective method for the estimation of ozone in air based on the formation of cracks in rubber st jected to strain, has been developed. The differential creep of natural rubber thread, one-half which is subject to ozone containing atmosphere, the other half protected from ozone, is a sensiti measure of the severity of ozone attack or cracking. The instrument, the B. F. Goodrich ozonome is a small, self-contained unit which may be operated in the horizontal or vertical position. T instrument may also be used for comparisons of the resistance of rubber compounds to ozone atta under conditions of controlled ozone concentration. *Subject Headings:* **1. Ozone concentrati 2. Rubber cracking 3. B. F. Goodrich ozonometer.**—*Authors' abstract.*

10F–2 551.510.534:551.521.7:535

Bezverkhniĭ, Sh. A., **O nekotorykh osobennostiiakh ul'trafioletovoĭ prozrachnosti atmosfe** [Some properties of the ultraviolet transparency of the atmosphere.] *Alma-Ata. Kazakh Nauchno-Issledovatel'skiĭ Institut, Trudy*, No. 2:23–31, **1954.** 5 figs., 14 refs. **DLC**—S. F. RODION advanced a theory of anomalous atmospheric transparency (1938) which accounts for an effect selective absorption in the ultraviolet region. Due to this effect the atmosphere becomes relativ more transparent for the shorter of two wave lengths measured at low zenith angles. The select absorption is caused by tropospheric water droplets or aerosols. In the present paper RODIONO hypothesis and the Götz Umkehr effect hypothesis are tested against observations made at Alma-A

th photoelectric cells and filters. Results of the observations support RODIONOV's theory and are consistent with the Götz hypothesis which is based solely on an ozone effect. According to the thor "the Umkehr effect is affected by optical properties of the troposphere and therefore the ethod of determining vertical ozone distribution based on this effect must be considered unsuitable." *bject Headings:* **1. Umkehr effect 2. Ultraviolet absorption 3. Alma-Ata, U.S.S.R.**—*G.T.*

10F–3 551.510.534(931)

*Farkas, Edith, **Measurements of atmospheric ozone at Wellington, New Zealand.** *New aland. Meteorological Service, Technical Note*, No. 114, Aug. 19, **1954.** 13 p. tables, 2 refs. **WB**—Values of total amount of atmospheric ozone, as measured near noon on weekdays at Wellgton by means of the Dobson photoelectric spectrophotometer No. 17, are tabulated for the period ıg. 1951 to July 1954. *Subject Headings:* **1. Ozone data 2. Wellington, New Zealand.**—*Author's stract.*

10F–4 551.510.41:551.521.3:535.34

†Goldberg, Leo (*Dir., Univ. of Mich. Obs.*), **Absorption spectrum of the atmosphere.** (In: uiper, Gerard P., *ed.*, **The earth as a planet.** Chicago. Univ. of Chicago Press, **1954.** p. 434–490. figs., 5 tables, 490 eqs., bibliog. p. 483–490.) **DLC**—The absorption spectra (both discrete and ntinuous) in all wave lengths, for all of the atmospheric constituents (N_2, O_2, O_3, N_2O, CO, CH_4, $_2O$, etc.) are taken up for each major spectral region, i.e., (1) 0–0.3μ (O_3, O_2, N_2, O, N) with discusn of transparency at high altitudes and with numerical values of abundance of elements, and mple spectrophotographs; (2) 0.3 to 24μ divided into 0.3 to 1.3μ, 1.4–2.5μ, 2.9–5.5μ, 7–13μ and –24μ; and (3) mm and cm wave lengths. Line spectra and line absorption coefficients, abundances gases, vertical distribution, especially of H_2O, CO_2 and CH_4; band-width, pressure and temperature ects and finally recent findings from rocket and laboratory experiments are discussed. *Subject eadings:* **1. Absorption spectra 2. Atmospheric composition.**—*M.R.*

10F–5 551.510.534:551.521.31

Goody, R. M. and Walshaw, C. D., **An investigation of the 9.6μ band of ozone in the telluric ectrum.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings the Toronto Meteorological Conference, Sept. 9–15, 1953,** pub. **1954.** p. 27–30. 3 figs., 3 refs.) **WB**—Solar spectrum in 9.6μ region recorded at Cambridge, Eng., in 1952, which depends on essure distribution of ozone, and total ozone measurements at Oxford, gave a mean height of ozone yer of 18 km with a minimum of 15 km in early Aug. (*Same item as* 6.3–99, March 1955, *MAB.*) *ubject Heading:* **1. Ozone distribution.**—*C.E.P.B.*

10F–6 551.510.42:551.575

Haagen, Smit, A. J. (*Calif. Inst. of Techn.*) and Fox, M. M. (*L. A. County Air Pollution Control istrict*), **Photochemical ozone formation with hydrocarbons and automobile exhaust.** *Air Repair*, ttsburgh, 4(3):105–108, 136, Nov. **1954.** 7 figs., table. **DWB**—Effects of solar radiation on one concentrations in the air during Los Angeles smog conditions were simulated in the laboratory determine the true nature of the chemical (oxidizing) processes and the efficiency of the (rubber acking) testing methods in current use. Data are given graphically and in tables. Also the nount of O_3 formed in automobile exhaust (thought to be the main source of oxidants) was tested ıder idling and accelerating and cruising conditions. NO_2 is an important factor in reacting with e O_3 to reduce its concentration during acceleration or idling. More O_3 is formed during cruising an at other speeds. Sunlight is also an important factor. *Subject Headings:* **1. Smog formation Ozone in smog 3. Los Angeles, Calif.**—*M.R.*

10F–7 551.507.362.1:551.510.534:551.521.13

Johnson, Francis S., **Rocket observations of atmospheric ozone.** (In: American Meteorological ciety and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, pt. 9–15, 1953,** pub. 1954. p. 17–26. 11 figs., table, 18 refs.) **DWB**—Ozone data at White nds, N. Mex., from UV spectra up to 70 km are compared with Umkehr results and show good reement. Data from two rocket flights above 50 km agree with calculated photochemical equirium amounts, including oxygen recombination 3-body process. The solar spectral-irradiance rve outside earth's atmosphere is reconsidered, indicating solar constant of 2.00 cal cm^{-2} min^{-1}. urnal and annual temperature variations and cooling rate are calculated and discussed. (*Same m as* 6.3–53, March 1955, *MAB.*) *Subject Headings:* **1. Rocket soundings 2. Ozone distribution Solar constant.**—*C.E.P.B.*

10F–8 551.510.534:551.507.362.1

*Johnson, F. S.; Purcell, J. D. and Tousey, R. (*U. S. Naval Res. Lab., Wash.* 25, *D. C.*), **Studies the ozone layer above New Mexico.** (In: Boyd, R. L. F., Seaton, M. J. and Massey, H. S. W. *ds.*), **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 189–199.

Vassy, E., **Remarks,** *Ibid.*, p. 200–201. 8+1 figs., table, 13+6 refs.) **DWB**—This paper sum marizes and discusses the data on the vertical distribution of ozone obtained by solar spectroscop methods from rockets flown in New Mexico. The results extending in one case to 70 km, are in goo agreement with photochemical theory. Data on total ozone, and, on one occasion, Umkehr effe measurements of its vertical distribution, are compared with the direct observations. Results of calculation of the diurnal temperature variation in the ozone layer, using the rocket data, are in cluded. The rocket data, which are all based on spectrometric observations of ozone absorptio of the solar radiation, have been obtained in three ways: photographic, photoelectric, and by photo counters. VASSY calls attention to possible discrepancies due to lack of validity of absorptio coefficients (NY and CHOONG) in Hartley band or to possible pressure and temperature effects HARTLEY or HUGGINS. (*Same item as* 6E–192, May 1955, *MAB.*) *Subject Headings:* **1. Ozon distribution 2. Rocket soundings 3. Ozone temperatures.**—*Authors' abstract, M.R.*

10F–9 551.510.534:546.2

Kay, R. H. (*Clarendon Lab., Oxford*), **The measurement of ozone vertical distribution by chemical method to heights of 12 km from aircraft.** (In: Boyd, R. L. F.; Seaton, M. J. and Masse H. S. W. (*eds.*), **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 208–21 fig., 2 tables, 2 refs.) **DWB**—Results of 15 flights made at Farnborough, Eng., are reported, which ozone concentrations at 15 or 16 levels up to 12 km were measured by means of Ehmer method. The total amount of ozone below 12 km is found to be 8½% of the total, its vertical di tribution is represented by a steady slight rise in concentration. A comparative diagram is pr sented, showing these results along with vertical distribution curves obtained by other investigato *Subject Headings:* **1. Ozone measurement techniques 2. Vertical ozone distribution 3. Chemic ozone determination.**—*G.T.*

10F–10 551.510.534:551.524.7:546.2

†*Khalek, Abdul (*Lab. de Physique de l'Atmosphère*), **Variation diurne et annuelle de l'épaisse réduite et de la température moyenne de l'ozone atmosphérique à Kaboul.** [Daily and annu variation of the reduced thickness and of the mean temperature of the atmospheric ozone at Kab (Afghanistan).] *Journal Scientifique de la Météorologie, Paris,* 6(23):85–118, July/Sept. **1954.** figs., 9 tables, 32 refs., eqs. Issued also as his Thesis (Dr. Sci.)—Paris University, May 17, 195 73 p. 9 tables, eqs., graphs, bibliog. p. 70–72. **DWB**—A thorough study of a year of data on ozo depth, ozone layer temperature, and the diurnal and seasonal as well as air mass variations there A double prism quartz spectrograph furnished by M. and MME. VASSY and with plates sensitive the region 5790 Å was used to obtain spectra from which the reduced O_3 thickness at Kabul could calculated for each month; by taking 40 or more spectra each day (every 10 min) on favorable da the diurnal as well as the seasonal variations could be calculated also. A maximum at each equin and minimum in summer (also a minimum at noon in summer) was discovered and is explained the basis of photochemical theory. Comparison is made with seasonal curves for other plac in low latitudes. Sharp seasonal variations characterize Kabul data, whereas at Kodaikan India (10°N), only slight seasonal variation appears. (*Same item as* 6.9–140, Sept. 1955, *MA Subject Headings:* **1. Ozone observations 2. Ozone layer temperatures 3. Kabul, Afghanista** —*M.R.*

10F–11 551.510.53:551.507.362:546.2

†Leak, William M., **Rocket research at NRL.** *U. S. Naval Research Laboratory, NRL Repo* No. 4441, Nov. 12, **1954.** 26 p. 20 figs., table, 41 refs. **DWB**—Data on O_3 composition w obtained up to 70 km on June 14, 1949, showing maximum concentration with respect to air 28 km (the same as in Oct. 10, 1946) though actual maximum O_3 was at 26 km (0.11 mm/km) a at 24 km (0.17 mm/km). These data and other data from 20 to 70 km agree with photochemic theories of WULF and DEMING (1936 and 1937), DÜTSCH (1946), CRAIG (1950) and BATES a NICOLET (1950) as calculated according to Chapman's method (1930). (*Same item as* 6E–19 May 1955, *MAB.*) *Subject Headings:* **1. Rocket research 2. Upper atmosphere compositi 3. Photochemical theory of ozone. I. U. S. Naval Research Laboratory.**—*M.R.*

10F–12 551.510.534:550.3

Malurkar, S. L., **Geomagnetic variations and diurnal range of atmospheric ozone.** *Annali Geofisica,* 7(2):209–213, April **1954.** 3 figs., 5 refs. **DLC**—The relationship of the variation of t diurnal range of atmospheric ozone and the mean world geomagnetic K figures as measured Tromsö and Bear Island, respectively, are analyzed. The daily figures of diurnal ozone variatio in units of 0.001 cm and the daily sum of 3 hr character figures are presented in graphs. It is se that when the values of diurnal range of atmospheric ozone increase the magnetic character su also increases, but while the latter, after having increased, takes some days to return to its norm or original value the former drops back rapidly. (*Same item as* 8.1–179, Jan. 1957, *MAB.*) *Subj Headings:* **1. Diurnal ozone variations 2. Geomagnetic variations.**—*I.L.D.*

10F–13 551.510.534:551.508.952

Miyake, Y. and Kawamura, K. (*Met. Res. Inst., Japan*), **Studies on atmospheric ozone at okyo.** *Meteorological Society of Japan, Journal*, 2nd Ser., 32(4):96–110, April **1954.** In Japanese; nglish summary p. 96. 8 figs., 2 tables, 24 refs. Also in: *Papers in Meteorology and Geophysics*, okyo, 5(2):178–181, Sept. **1954. MH-BH**—The amount of atmospheric ozone was measured at okyo during the period Jan. 1951–Sept. 1952, using a chromium photoelectric tube and glass iters (R. STAIR's method). According to results of these observations, the amount of atmospheric zone shows a marked seasonal variation with a maximum in late spring (about 0.28 cm) and a inimum in fall (about 0.22 cm). This agrees fairly well with the results obtained by other ob- rvers in similar latitudes. Relations between variations of ozone amount and meteorological ctors, such as atmospheric pressure, temperature, wind direction and vertical motion, are analyzed. *ame item as* 6.9–141, Sept. 1955, *MAB.*) *Subject Headings:* **1. Ozone measurements 2. Ozone ariations 3. Tokyo, Japan.**—*From authors' abstract.*

10F–14 551.510.534:551.524.7

Momin, A. U., **Spectroscopic measurement of the diurnal variation of the effective ozonosphere mperature.** *Current Science*, Bangalore, 23(5):143–144, May **1954.** 2 figs., 6 refs. **DWB**— method is described for determining ozonosphere temperature by comparing the emission of a ermocouple detector in an infrared spectroscope at 9.6μ with the emission of the atmospheric ozone yer at the same wave length. Measurements made by applying this method are reported from oona, India (18°30′N, 73°51′E) for May, Oct., and Nov., 1953. As a result of the measurements, curve showing the diurnal variation of ozonosphere temperature is presented. (*Same item as* 11–63, Nov. 1954, *MAB.*) *Subject Headings:* **1. Ozonosphere temperature variations 2. Poona, dia.**—*G.T*

10F–15 551.510.534

Normand, Sir Charles W. B., **Ozone and the upper atmosphere.** (In: American Meteorological ociety and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, ept. 9–15, 1953,** pub. **1954.** p. 4–8. 8 refs.) **DWB**—Introductory talk to discussion on **Ozone d the high atmosphere.** Evidence of atmospheric structure and ozone layer variations is sum- arized and causes of ozone changes discussed and recent improvements in technique referred to. *ame item as* 6.3–100, March 1955, *MAB.*) *Subject Heading:* **1. Ozone layer.**—*C.E.P.B.*

10F–16 551.594.5 551.510.534:546.214

*Norske Institutt for Kosmisk Fysikk, **The Auroral Observatory at Tromsö** (φ **=69°39′.8N, =18°56′.9E Gr.). Observations 1952.** Its *Publikasjoner*, No. 35, pub. **1954.** 31 p. graphs, figs., numerous tables. **DWB**—A brief description of the auroral and twilight sodium research pectrograph observation) at Tromsö and Oslo, and ozone observations at Tromsö (9 months) d Longyear, Spitsbergen (7 month) with a Dobson spectrophotometer. The Longyear observa- ns were started in Sept. 1950 by S. H. H. LARSEN. The results of the first 2 years of observation ere will be published in a separate paper. Following the 1-page discussion are tables of O_3 values r each day of the observation period in 1952. Geomagnetic observations at Tromsö and Bear land; radio echo observations and hourly ionospheric values of critical E, FoE, and F1, F2 and rtical height, storminess horizontal and vertical intensity and storminess values for each hour of e year are tabulated and shown in graphs. (*Same item as* 8.1–114, Jan. 1957, *MAB.*) *Subject eadings:* **1. Auroral observations 2. Ozone data 3. Twilight Na 4. Geomagnetic data 5. Iono- heric data 6. Tromsö, Norway 7. Longyear, Spitsbergen. I. Tromsö, Norway. Nordlys- bservatoriet.**—*M.R.*

10F–17 551.510.534:551.557.3

Paetzold, H. K., **Ozonschicht und Luftbewegungen in der Stratosphäre.** [Ozone layer and movements in the stratosphere.] *Naturwissenschaften*, 41(14):318–322, July **1954.** 3 figs., refs. **DLC**—Vertical distribution of ozone concentration at Weissenau shows marked variations. imary maximum is always near 23 km. Secondary maximum near 16 km only occurs when air 11–16 km comes from north, and is absent in fall and winter, in agreement with annual variation 20 km in polar regions. A third peak at 6 km is probably also advective. Ratio ozone/air is nstant near 20 km showing that vertical movements vanish at that height. Above that is a rtical oscillation with amplitude at least 10 km. Annual variation of ozone at different heights set out and analyzed into photochemical and advective factors and vertical transport. (*Same n as* 5.11–64; Nov. 1954, *MAB.*) *Subject Headings:* **1. Ozone layer 2. Stratospheric winds.** *C.E.P.B.*

10F–18 551.521.31:551.510.534

Pressman, Jerome (*U. S. A. F. Cambridge Res. Center, Mass.*), **The latitudinal and seasonal riations of the absorption of solar radiation by ozone.** *Journal of Geophysical Research*, 59(4):

485–498, Dec. **1954.** 23 figs., table, 13 refs., 15 eqs. Also issued as: *U. S. Air Force. Cambr Research Center, Geophysical Research Papers*, No. 33, **1954.** 34 p. **DWB**—A calculation is m of the latitudinal and seasonal variation of ozone absorption broken up into two phases. Fi this calculation is made for constant ozone distribution over the earth to display the effect of len of day and solar altitude factor. Then the calculation is made of an ozone distribution which va with latitude in accordance with Götz. The calculations are based on extension of Craig's cu of $E^N{}_z/n$ ($E^n{}_z$—energy absorbed by unit volume per second of solar radiation after passing thro N cm of O_3 NTP; n—concentration of O_3). The energy absorbed during twilight in north latitudes is also included in the calculations. The results indicate that the length of day and s altitude factor are sufficient to give the major features of the ozone solar absorption. (*Same iten* 6.11–225, Nov. 1955, *MAB.*) *Subject Headings:* **1. Ozone absorption 2. Seasonal ozone variati 3. Ozone distribution.**—*Author's abstract.*

10F–19 551.510.41:546.

Regener, Victor H., **Atmospheric ozone.** New Mexico. Univ. Dept. of Physics, Contr AF 19(122)-381, Scientific Reports, No. 1–5, June 22–Aug. 13, **1954.** 5 pieces. figs., tables, r eqs. Also: Final Report, Aug. 15, **1954.** 16 p. **DWB**—Report No. 1 entitled **The direct spec graphic measurement of atmospheric ozone concentrations;** No. 2, **On the vertical distributior atmospheric ozone;** No. 3, **Atmospheric ozone in the Los Angeles region;** No. 4, **Atmospheric oz in the boundary layer;** and No. 5, **Recordings of surface ozone in New Mexico** (including volumin graphic data for surface meteorological conditions at Albuquerque). The Final Report summar the work of the project and the essentials of the 5 reports, and contains chapters on (II) spectrograp measurement of O_3, (III) vertical distribution of O_3, (IV) O_3 in the Los Angeles region, (V) in boundary layer, (VI) surface O_3 in New Mexico and (VIII) conclusions and recommendati Automatic chemical methods used are said to be accurate within a few % and give reliable res even in the presence of large amounts of air pollution. Direct spectrographic determinatior vertical O_3 distribution using flash tube as an artificial light source is feasible. Mountain readings near Albuquerque show the increase of O_3 during cold front passage, whereas the va stations show typical diurnal variation where nocturnal inversions prevail. Using mountain valley data obtained over many months, an estimate of turbulent diffusion relationships and O_3 to ground (4.10^{10} molecules cm^2 sec) was obtained. The report summarizes the results of 7 year concentrated effort by the author and numerous assistants. (For more details on Reports 2 an *see* 6.11–165, Nov. 1955 and 7.6–108, June 1956, *MAB.*) *Subject Headings:* **1. Ozone resea 2. New Mexico 3. Los Angeles, Calif.**—*M.R.*

10F–20 551.510.534:546.

Regener, E.; Paetzold, H. K. and Ehmert, A., **Further investigations on the ozone layer.** Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W. (*eds.*) **Rocket exploration of the upper atm sphere.** London, Pergamon, **1954.** p. 202–207. 8 figs., 8 refs.) **DWB**—Ozone concentrati have been determined by the following methods: 1) balloon ascents with a UV spectrograph to km, 2) lunar eclipse method and 3) chemical methods (on the ground and in aircraft). The pa presents the results of many such ascents or observations, showing wide variation in height concentration of O_3 maximum, different times and places, though average of all these distributior in agreement with photochemical theory for region above 24 km and latitudes 0–70°N. Res indicate that a) O_3 increases sharply between 10 and 21 km in Polar regions at the end of the p night, b) layer above 20 km is nearly constant (.18–.20 cm O_3), c) above 30 km a maximum oc in early summer due to photochemical processes, and at 20–25 km a minimum due to increa turbulence, and d) <20 km vertical currents give a maximum compression in Nov. and a maxim expansion in May. (*Same item as* 6E–196, May 1955, *MAB.*) *Subject Headings:* **1. Ozone va tions 2. Photochemical theory of ozone.**—*M.R.*

10F–21 551.510.41:546

Sekihara, Kyo (*Met. Res. Inst., Japan*), **On the chemical determination of atmospheric o at the summit of Mt. Fuji.** *Meteorological Society of Japan, Journal*, 2nd Ser., 32(4):111–116, A **1954.** 4 figs., 6 refs. In Japanese; English summary p. 111. **DWB**—An electrochemical appa for the measurement of atmospheric ozone which was originally developed by A. Ehmert constructed, and practical observations with it were carried out three times a day at the summ Mt. Fuji from Aug. 13 to 18, 1953. According to the results of observation, the ozone concentra increases anomalously before the occurrence of St. Elmo's fire. A notable decrease which is sumably related with the passage of frontal zone was also observed. Ehmert's method of termination of atmospheric ozone is criticized from the viewpoint of meteorological observa (*Same item as* 6.5–86, May 1955, *MAB.*) *Subject Headings:* **1. Chemical ozone determin 2. Ozone measurements 3. Ozone concentration 4. Mt. Fuji, Japan.**—*Author's abstract.*

10F–22 551.510.534:551.508.952

Stair, Ralph; Bagg, Thomas C. and Johnston, Russell G., **Continuous measurement of atmospheric ozone by an automatic photoelectric method.** *U. S. National Bureau of Standards, Journal of Research*, 52(3):133–139, March **1954.** 8 figs., table, 15 refs. **DLC**—An automatic photoelectric instrument and method for the continuous measurement of the ozone in the earth's atmosphere at low altitudes are described. The method is physical rather than chemical in character and is based upon the optical absorption characteristics of ozone in the Hartley and Huggins ultraviolet bands. The instrument makes use of a low-pressure mercury arc, which is situated at a distance of 1450 ft from the recording station that employs a 1 P28 photomultiplier as a detector. The light beam is modulated, at 510 cycles per sec., so that the output of the photomultiplier is fed into a tuned alternating-current amplifier and amplified to the recorder level. By means of a Geneva mechanism, which changes the glass filters, the radiant energy from the lamp is separated into bands primarily at wave lengths 253.7, 365.5 and 404.0 millimicrons. From the ratios of the reflections for the different spectral regions, it is possible to determine ozone concentration in the range from a few tenths of 1 part to many parts per 100 million. *Subject Headings:* **1. Ozone measurement techniques 2. Photoelectric spectrometers.**—*Authors' abstract.*

10F–23 551.510.41:546.214:551.515.4

Vassy, Arlette, **Relations entre l'ozone atmosphérique et les orages.** [Relation between atmospheric ozone and thunderstorm activity.] *Académie des Sciences, Paris, Comptes Rendus*, 239(20):1309–1311, Nov. 15, **1954.** 3 refs. **DWB**—A continuous record of ozone concentration near the ground was compared with a continuous record obtained with a thunderstorm discharge meter. The comparison reveals an increase in ozone concentration during thunderstorms. The records show that the sudden increase in ozone concentration always precedes the first thunderstorm discharges, the lag being 3½ hours on the average. (*Same item as* 6.9–131, Sept. 1955, *MAB.*) *Subject Headings:* **1. Ozone concentration 2. Thunderstorm activity 3. Ozone-thunderstorm relationships.**—*Transl. of author's abstract.*

10F–24 551.510.534:523.38

Vigroux, Ernest, **Photométrie d'une éclipse de lune: répartition de l'ozone.** [Photometry of an eclipse of the moon: ozone distribution.] *Académie des Sciences, Paris, Comptes Rendus*, 239(4):339–341, July 26, **1954.** 2 figs., ref. **DWB**—Curves showing the height distribution of ozone (Jan. 1953) are presented on the basis of measurements of the density of shadow in the visible ranges of spectra corresponding to trajectories varying widely with altitude at closely neighboring latitudes. (*Same item as* 6.4–121, April 1955, *MAB.*) *Subject Headings:* **1. Ozone height distribution 2. Lunar eclipses 3. Earth's shadow.**—*Transl. of author's abstract.*

10F–25 551.521.18:551.510.534

Walshaw, C. D. and Goody, R. M., **Absorption by the 9.6μ band of ozone.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953,** pub. **1954.** p. 49–52. 3 figs., 7 refs., 2 eqs.) **DWB**—Intensity of absorption was measured for ozone amounts up to 1.5 cm STP and pressures ½–760 mm. The failure to fit a single curve to the observations is attributed to the assumption of an infinite homogeneous array of absorption lines, and an empirical correction factor is defined which gives a sufficiently good fit for purposes of calculation. (*Same item as* 6.3–131, March 1955, *MAB.*) *Subject Headings:* **1. Infrared absorption 2. Ozone absorption.**—*C.E.P.B.*

10F–26 551.510.534:546.214

Wulf, Oliver Reynolds (*U. S. W. B., Pasadena*) and Zimmerman, James E. (*Astrophysical Obs., Smithsonian Inst., Table Mt., Calif.*), **A method for the measurement of atmospheric ozone using the absorption of ozone in the visible spectrum.** *Smithsonian Miscellaneous Collections*, Wash., D. C., 123(3), Oct. 27, **1954.** 14 p. 5 tables, refs., 17 eqs. *Smithsonian Institution, Publication*, No. 4177. **DWB**—An analytical method has been developed for computing the vertical path of atmospheric ozone from the measurements of atmospheric transmission coefficients at several wave lengths across the visible spectrum using the absorption of ozone in this region. In the computational procedure a large part of the calculations is carried out once and for all, the evaluation of the ozone corresponding to any one set of observations being a relatively small matter. The method also yields information concerning atmospheric haze. The optical densities corresponding to the measured transmission coefficients are represented in the present work by four terms. Two of these are the scattering by the molecules of the air and the absorption by ozone. The other two represent the scattering by haze, one a wave length-independent portion, and the other a term in the square of the reciprocal of the wave length with unknown coefficient. The values of this coefficient and of the wavelength-independent scattering, in addition to the ozone path, are given by the calculations,

and constitute information on the character of the optical density of the haze. (*Same item a* 6.7–157, July 1955, *MAB.*) *Subject Headings:* **1. Ozone measurement techniques 2. Ozone absorption 3. Transmission coefficients.**—*Authors' abstract.*

1955

10F–27 551.510.534:551.515(584.6

Bezverkhniĭ, Sh. A., **Ozonometricheskie dannye po Alma-Ate v sopostavlenii s nekotorymi meteorologicheskimi faktorami.** [Ozone data for Alma-Ata, as compared to some meteorological factors.] *Alma-Ata, Kazakhstan. Kazakhskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy*, No. 5:89–100, **1955.** 7 figs., 7 tables, 19 refs., 7 eqs. **DLC**—Atmospheric ozone at Alma-Ata was measured by means of an electrophotometer with filters, measuring UV radiation intensity at different wave lengths (1953, 1954). Preliminary results derived from the measurements indicate a decrease of ozone amount during southerly advection (probably due to the presence of aerosols to heights beyond the tropopause). Data on the correlation of ozone with stratospheric temperature are also presented. *Subject Headings:* **1. Ozone-weather relationships 2. Alma-Ata U.S.S.R.**—*G.T.*

10F–28 551.510.534:551.508.952(798

*Cain, Joseph C. and Cain, Anne B., **Atmospheric ozone at College, Alaska.** Alaska. Univ. Geophysical Institute, Contract AF 19(604)-127, Final Report, March **1955.** 65+125 p. 11 figs., 15+ tables, 18 refs.—This report summarizes the work done with a Dobson ozone spectrophotometer during the period April, 1952 to Nov. 1954 at College, Alaska. A brief explanation is given of the presence of ozone in the atmosphere along with its aeronomic significance. The Dobson ozone spectrophotometer is described and its operation discussed in some detail in order to bring out those features that have a bearing on the results. The theory of the direct observations is outlined and the approximations discussed; the problems of observation at high zenith angles are considered. The zenith observations for the determination of the total amount and vertical distribution of ozone are briefly discussed. A resume of the observations and a complete tabulation of all data is given. The annual variation is analyzed and compared with that at other observatories. It is recommended that further reduction and analysis of the data be done both statistically and synoptically. Further it is recommended that routine observations be continued after some improvements are made in the condition of the instrument. *Subject Headings:* **1. Ozone data 2. Dobson spectrophotometer 3. College, Alaska.**—*Authors' abstract.*

10F–29 551.510.534:523.3

Chalonge, D., **Exploration de l'atmosphère terrestre au moyen des éclipses de lune.** [Exploring the earth's atmosphere by means of lunar eclipses.] *L'Astronomie*, 69:319–336, Sept. **1955.** 1 figs., 2 tables, 8 refs. **DWB**—Spectrophotographic data obtained in France during the lunar eclipses of Jan. 29/30, 1953 are presented and discussed in detail. Vertical and latitudinal distributions of atmospheric ozone are derived from densities of the earth's shadow measured at different wave lengths at different points of the moon. Absorption due to other atmospheric constituents is also mentioned. *Subject Headings:* **1. Ozone distribution 2. Lunar eclipses 3. Earth's shadow.**—*G.T.*

10F–30 551.510.53

Epstein, Edward S.; Osterberg, Charles and Adel, Arthur, **Manual for VODARO, vertical ozone distribution from the absorption and radiation by ozone,** Arizona State College, Contract AF 19(122)-198, Scientific Report HA-7, Dec. 1, **1955.** 177 p. 19 figs., 4 tables, 2 refs., eqs. (numerous tables and eqs. in appendixes).—A new method for determining the vertical distribution of ozone, utilizing only surface observations, has been developed. Infrared observations of the absorption and radiation by ozone, and ultraviolet determinations of total ozone amount are used to complement one another. The theoretical background of the method is discussed in detail. Complete instructions for determining the distributions, including the techniques which have been developed at ARO, and the necessary tables, are presented. Also presented are the results of applying the method to data collected in the seven months beginning Feb. 1955 (124 days' observations). The principal result is that ozone distributions are *not* related in any simple way to the total amount of ozone. When observations of the vertical distribution of ozone become available over a network of stations it will be possible to add much to our knowledge of the relationships between ozone densities, their equilibrium values, atmospheric circulation, and solar variations. *Subject Headings:* **1. Ozone layer measurement 2. Vertical ozone distribution.**—*Authors' abstract.*

10F–31 551.510.41:546.21

Frenkiel, F. N. (*Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.*), **Ozone theory in the troposphere.** *Journal of Chemical Physics*, N. Y., 23(12):2440, Dec. **1955.** 2 refs. **DLC**—This is an abstract of a paper presented as part of the lecture on **Fluid dynamics problems in geo**

ysical sciences, at the American Physical Society Meeting in Mexico City, Aug. 29, 1955. Present eories attribute atmospheric O_3 to photodissociation in the stratosphere. The author presents idence that O_3 produced by photodissociation of hydrocarbons and NO_2 in industrial areas could count for the vertical distribution of O_3 in the troposphere. The O_3 could be diffused from in-strial areas throughout the country and would be of the order of magnitude of measured values. or Spanish version of the abstract, *see Pan American Union, Ciencia y Tecnología,* 5(18):130, ly/Sept. 1955.) (*Same item as* 8.4–147, April 1957, *MAB.*) *Subject Headings:* **1. Ozone in oposphere 2. Photodissociation of hydrocarbons.**—*M.R.*

10F–32 551.506.1:551.510.41:546.214(43)

*Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, **eutsches Meteorologisches Jahrbuch, 1954, Teil 4, Heft 2, Beobachtungen des Meteorologischen bservatoriums Wahnsdorf.** [German Meteorological Yearbook, 1954, Pt. 4, Sec. 2, Observations the Wahnsdorf Meteorological Observatory.] Berlin, Akademie-Verlag, **1955.** 138 p. almost ntirely tables. **DWB**—Includes ozone measurements 4 times a day at surface at Wahnsdorf and ichtelberg. (For a fuller abstract, *see* 7.10–73, Oct. 1956, *MAB.*) *Subject Headings:* **1. Ozone ata 2. Wahnsdorf, Germany 3. Fichtelberg, Germany.**—*G.T.*

10F–33 551.510.41:551.510.42:546.214:59

Gorodinskiĭ, S. M., **K kharakteristike ozona kak promyshlennogo iada.** [Ozone as industrial oison.] *Gigiena i Sanitariia,* Moscow, No. 2:28–32, Feb. **1955.** 2 figs., 10 refs. **DLC**—A study ming at determining the quantitative content of ozone in the atmosphere produced by electric harges in the vicinity of high voltage generators, gaseous spectrographs and ultraviolet lamps, and ie role of meteorological factors, dust, etc. that may affect adversely the health and work capacity workers. Some data on the ozone content of factories are presented. Using white mice, rabbits, c. as experimental subjects, the author studied the lethal concentration of ozone, its effect on flex action, and upon bronchial and nerve tissues, its threshold of toxicity, etc. The effect of ozone working capacity was studied on 48 workers. (*Same item as* 7.6–101, June 1956, *MAB.*) *Subject eadings:* **1. Ozone concentration in factories 2. Atmospheric pollution 7. Ozone effects on imals.**—*I.L.D.*

10F–34 550.3:061.3

International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 954, **Procès-verbaux; Actes de l'Association.** Its *Publication A.I.M.*, No. 10/b, pub. London, Oct. 955. 82 p. In French and English. **DWB** (M06 I611g, Met. 1954)—The work of the Ozone ommission is given in some detail (p. 55–61) for the years 1951–54. The Ozone Commission suffered om the death of F. W. P. Götz. G. M. B. Dobson was elected President and Sir Charles Nor-and, Secretary. The association owns five ozone spectrophotometers loaned to stations in Spits-rgen, the Azores, Arosa, Aarhus and Westmorland. A new ultraviolet spectroscope will be sent Kabul. In addition, 5 are located in Britain, 3 in Italy and one each in Norway, Sweden, Belgium, rance and Iceland. Six are in N. America, 3 in India, 1 in Pakistan and 1 in New Zealand. One ill be set up in Antarctica, 3 in Australia and 1 in Japan. (For a fuller abstract, *see* 9.10–49, Oct. 958, *MAB.*) *Subject Headings:* **1. IUGG. Association of meteorology reports 2. International zone Commission 3. Ozone networks.**—*M.R.*

10F–35 551.510.534:551.524.7

Johansen, Harald, **Variations in the total amount of ozone over Tromsø, and their correlations ith other meteorological elements.** *Geofysiske Publikasjoner,* Oslo, 19(5), **1955.** 19 p. 9 figs., tables, 21 refs. Price: 3.50 Kr. **DLC, DWB**—Simultaneous upper air and ozone observations ade at Tromsö during the period May 1941–Oct. 1944 are analyzed statistically. This study deals ith the following: correlation between the total amount of ozone and (1) the height of the tropo-ause, correlation, (2) the temperature in the upper atmosphere and the lower stratosphere, (3) tem-erature, potential temperature and pressure at various levels of the atmosphere; causes of day-to-day ariations of the total amount of ozone; and ozone variations in relation to fronts and air masses. *Same item as* 6.9–139, Sept. 1955, *MAB.*) *Subject Headings:* **1. Ozone variations 2. Ozone rrelations 3. Tromsö, Norway.**—*I.L.D.*

10F–36 551.510.534(984)

Larsen, S. H. H., **Vertical distribution of atmospheric ozone at Longyearbyen, Spitzbergen 8°N).** *Journal of Atmospheric and Terrestrial Physics,* 6(1):46–49, Jan. **1955.** 2 figs., 4 tables, refs. **DWB**—Observations with a Dobson spectrophotometer in Sept. 1950 and April 1951 were ed to calculate vertical distribution of ozone (0-65 km) with total amounts of 0.190, 0.205 and 335 cm. Centers of gravity were 23.4, 22.9 and 21.9 km. Peak ratio O_3/air by volume was $8-12.5\times10^{-6}$ at 35 km. Results resemble those at Tromsö (70°N). (*Same item as* 6.5–104, ay 1955, *MAB.*) *Subject Headings:* **1. Vertical ozone distribution 2. Spitsbergen.**—*C.E.P.B.*

10F–37 551.510.534(234.3

Paetzold, H. K. and Zschörner, H., **Beobachtung eines "Ozonloches" über den Alpen.** [Ob servation of an "ozone window" over the Alps.] *Zeitschrift für Meteorologie*, 9(8):250–251, Aug **1955.** 2 figs., 3 refs. **DWB, DLC**—On Nov. 17, 1953, a series of spectra of sunlight from Zugspitz with very low sun gave the thickness of the ozone layer as 0.16 cm at $z=88°$, decreasing to 0.0 at $z=79$. By 11h 40m the value had increased again to 0.16 cm. The drop is attributed to marked local distribution of the ozone layer, the "window" being over the Carnic Alps in a föh wave. (*Same item as* 8.2–113, Feb. 1957, *MAB.*) *Subject Headings:* **1. Ozone variations 2. Zug spitze, Austria.**—*C.E.P.B.*

10F–38 551.510.53

†Paetzold, Hans-Karl (*Max-Planck-Inst. für Physik der Stratosphäre, Weissenau*), **Die vertikal Verteilung des atmosphärischen Ozons nach Ballonaufstiegen.** [Vertical distribution of atmos pheric ozone according to balloon soundings.] *Zeitschrift für Naturforschung, Sec. A*, Tübingen 10(1):33–41, Jan. **1955.** 8 figs., 25 refs. **DLC**—Results obtained during balloon soundings i recent years at Weissenau, using a UV spectrograph. The marked variations, which are attribute to horizontal and vertical advection, could occur only with vertical motions up to 50 km height o 1 to 10 cm/sec and a reversal of motion at 20 km. In the spring a secondary maximum was foun at 15 km, caused by advection of polar stratospheric air. Different types of vertical distributio are illustrated for different seasons. Equatorial ozone distribution calculation from data obtaine during lunar eclipses (1932–1943) is shown graphically and discussed. (*Same item as* 7.10–129 Oct. 1956, *MAB.*) *Subject Headings:* **1. Ozone distribution 2. Ozone advection from Arcti 3. Weissenau, Germany.**—*M.R.*

10F–39 551.524.7:535.34:551.510.53

Paetzold, H. K. and Zschörner, H., **Zur optischen Temperaturmessung des atmosphärische Ozons.** [On the optical temperature measurement of atmospheric ozone.] *Meteorologische Rund schau*, 8(5/6):92–93, May/June **1955.** fig., 7 refs. **DWB**—The temperature effect on the Huggin band of ozone can be used to measure temperature at about 30 km. The method is discussed. O Zugspitze, Nov. 1953, it gave $-35\pm2°C$. (*Same item as* 7.3–184, March 1956, *MAB.*) *Subje Headings:* **1. Ozone spectroscopy 2. Upper air temperature measurement.**—*C.E.P.B.*

10F–40 551.510.534:551.524.

Pressman, Jerome (*Geophysics Res. Directorate, A. F. Cambridge Res. Center*), **Diurnal tempera ture variations in the middle atmosphere.** *American Meteorological Society, Bulletin*, 36(5):220–22 May **1955.** 9 figs., 12 refs. **DWB**—A computation has been made of the seasonal and latitudina variation of the diurnal temperature changes in the ozonosphere. There was assumed a uniform cooling rate over a twenty-four hour period which exactly balanced the heating due to absorptio by ozone of solar energy. The computations indicate that the diurnal temperature variation curv is relatively constant with latitude up to about 75°N latitude. The maximum diurnal temperatur variation is at about 45 km. (*Same item as* 7.4–130, April 1956, *MAB.*) *Subject Headings:* **1. Diur nal temperature variations 2. Ozonosphere temperatures.**—*Author's abstract.*

10F–41 551.524.7:551.510.53

Pressman, Jerome, **Seasonal and latitudinal temperature changes in the ozonosphere.** *Journ of Meteorology*, 12(1):87–89, Feb. **1955.** 6 figs., table, 8 refs. **DWB**—Using assumed densities a 20 to 57.5 km and further assuming that energy absorbed by ozone went into heating, meridion cross sections 90°N-S of 24 hr temperature increment are given for 6 dates. They range up to 11° at 45 km over poles in summer. Below 20 km increment is negligible. (*Same item as* 6.5–16 May 1955, *MAB.*) *Subject Heading:* **1. Ozonosphere temperatures.**—*C.E.P.B.*

10F–42 551.510.42:551.508.952(794

Renzetti, Nicholas; Rogers, Lewis H. et al., **Physical measurements.** Air Pollution Foundatio Los Angeles, Calif., First Technical Progress Report, 1954, pub. March **1955.** p. 74–86. 6 figs 24 refs. **DWB**—Investigation of direction, identification and concentration of contaminants in smo based on physical characteristics, includes the obtaining of more definitive data on the presence ozone in the atmosphere, which has been found to be one of the most important constituents Los Angeles smog, with an ozone spectrometer manufactured by the Borman Engineering C Other types of spectral analysis are also reported. All enumerated projected measurements a discussed in detail with an analysis of their background, status and future plan of application. (F fuller abstract, *see* 7.2–117, Feb. 1956, *MAB.*) *Subject Headings:* **1. Atmospheric pollution measure ments 2. Ozone in smog 3. Ozone spectrometers 4. Los Angeles, Calif.**—*A.M.P.*

10F–43 551.510.42:551.575.1:614.7

Smog-fighting methods [and] Study smog problem using breathless humans. (and) **Auto exhausts and sun held cause of smog.** *Science News Letter*, 67(4):54–55, Jan. 22, **1955. DLC**—Sick people with a low respiratory reserve are easily affected by air pollution. Some 30 patients suffering from respiratory difficulties were exposed to environmental temperature, humidity and the general level of air pollution. They were checked every week during 3–4 month experiment designed to determine any specific correlation between measurable air pollution and measurable effects on human well-being. Experiments show that the content of nitrogen dioxide and hydrocarbon in auto exhaust react to form ozone in the presence of sunlight. Ozone was found to be a substantial part of the eye-tearing smog experienced in Los Angeles. Methods and measures against exhaust and industry-caused air pollution are discussed. *Subject Headings:* **1. Atmospheric pollution 2. Smog 3. Public health 4. Ozone near the ground.**—*W.N.*

10F–44 551.510.41:546.214:551.515

Teichert, Friedrich and Warmbt, Wolfgang, **Ozonuntersuchungen am Meteorologischen Observatorium Wahnsdorf.** [Ozone research at the Wahnsdorf Meteorological Observatory.] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 5(34); **1955.** 67 p. 29 figs., 25 tables, 84 refs. **DLC**—After reviewing briefly recent studies on the origin of ozone at the earth's surface and the history of ozone observations in Saxony, the authors present a detailed report on the ozone determinations made thrice daily at the Wahnsdorf Observatory in 1952. The measurement technique based upon the use of KI is described and the diurnal and monthly variations are discussed in relation to the origin of ozone at the earth's surface. The quantitative and statistical evaluation of the observational data includes the following: daily and annual variation of ozone, frequency distribution of classes of ozone amounts, relationship between ozone and large-scale weather processes, ozone and wind directions, the relationship between ozone and global radiation, relative humidity, electrical conductivity of the atmosphere, and vertical temperature gradient, ozone and heat exchange, ozone amounts on days with thunderstorms, and the relationship between ozone and inversions, frontal passages and weather situations. (*Same item as* 7.4–16, April 1956, *MAB.*) *Subject Headings:* **1. Ozone data 2. Ozone measurement techniques 3. Ozone-weather relationships 4. Wahnsdorf, Germany.**—*I.L.D.*

10F–45 551.510.41:546.214

*Teichert, F. (*Wahnsdorf, Met. Obs.*), **Vergleichende Messung des Ozongehaltes der Luft am Erdboden und in 80 m Höhe.** [Comparative measurement of ozone content of the air at ground level and at a height of 80 m.] *Zeitschrift für Meteorologie*, Berlin, 9(1):21–27, Jan. **1955.** 6 figs., 11 tables, 17 refs. **DWB, DLC**—Ozone measurements carried out at the Lindenberg Observatory during Aug. 1953 and June–Sept. 1954 at the ground surface and at a height of 80 m are discussed. Data on mean ozone values in γ ozone/cbm of air, hourly means for June–July and for Sept. 1954; hourly values for specific days, daily means for June–July and Sept. 1954 are given in tables and the distribution of temperature and relative humidity for given days with ozone measurements is shown in graphs. (*Same item as* 7.9–126, Sept. 1956, *MAB.*) *Subject Headings:* **1. Ozone data 2. Lindenberg, Germany.**—*I.L.D.*

10F–46 551.510.534:016

†Thorp, Clark E., **Bibliography of ozone technology. V. 1, Analytical procedures and patent index.** 209 p. **V. 2, Physical and pharmacological properties.** 160 p. Chicago, Ill., Armour Research Foundation of Illinois Institute of Technology, **1954, 1955. DLC**—Most of the over 800 annotated references (and 980 patents) listed in this bibliography pertain to physical properties, methods of analysis and industrial and pharmacological applications of ozone. Items covering various aspects of atmospheric ozone are included in both volumes. *Subject Heading:* **1. Ozone bibliographies.**—*G.T.*

10F–47 551.510.534:535.242

Valníček, Boris, **Přístroj pro meření celkového množství ozonu v zemské atmosféře astronomickou metodou.** [Instrument for astronomic measurement of the total amount of atmospheric ozone.] *Meteorologické Zprávy*, Prague, 8(3):83–84, June **1955.** 4 figs., 3 refs. Russian and German summaries p. 82. **DWB**—A photoelectric photometer operating in the region of Huggins' absorption bands of ozone in the solar spectrum is described. The instrument works around 3240 Å with the use of a selective filter. Details of measurement and analysis are discussed. Analysis is based on the Bouguer line derived from the measurements. The value obtained is total ozone content, expressed in centimeters of homogeneous atmospheric layer thickness. (*Same item as* 7.8–104, August 1956, *MAB.*) *Subject Headings:* **1. Ozone measurement 2. Photoelectric photometers.**—*Trans. of author's abstract.*

1956

10F–48 551.510.534:523.74:517.512

Adel, Arthur and Epstein, Edward S., **Power spectrum analysis of atmospheric ozone.** Arizona State College, Contract AF 19(122)-198, Scientific Report HA-8, Sept. 1, **1956.** 64 p. 4 figs., numerous tables, 12 refs.—Power spectra have been computed for three parameters of atmospheric ozone (ERTOR, infrared absorption by ozone, and total amount of ozone), 700 mb middle latitude zonal wind, geomagnetic planetary index, and FARTHING's "net" index of coronal activity. All the spectra of atmospheric variables exhibit spectral peaks in the vicinity of $2\frac{1}{2}$ week periods. Additional peaks in various ozone spectra indicate a high level summertime variation in ozone densities with a period near $1\frac{1}{2}$ weeks. The authors speculate as to possible interrelationships between solar activity and the ozone, and indicate possible future lines of attack on the problem. *Subject Headings:* **1. Power spectrum analysis 2. Infrared spectrum of ozone 3. Ozone-solar activity relationships 4. Mathematical techniques.**—*Authors' abstract.*

10F–49 551.510.41:546.214:523.78

Bezverkhniĭ, Sh A.; Osherovich, A. L. and Rodionov, S. F., **Elektrofotometricheskie issledovaniia atmosfernogo ozona vo vremia zatmeniĭ solntsa 25 II 1952 g. i 30 VI 1954 g.** [Electrophotometric investigations of atmospheric ozone during the solar eclipses of Feb. 25, 1952 and June 30, 1954.] *Akademiia Nauk SSSR, Doklady*, 106(4):651–654, Feb. 1, **1956.** 3 figs., 13 refs., 3 eqs. **DWB, DLC**—At a series of stations, whose coordinates are given, the ultraradiation of the sun and the atmospheric ozone during an eclipse were investigated with integral laboratory photometer with antimony-cesium photoelements and photointensifier. Ozone measurements, presented graphically, indicate an increase in ozone amount during full eclipse but that the ion-periodic ozone variations are fundamentally the result of meteorological factors in the atmosphere. (*Same item as* 8.9–150, Sept. 1957, *MAB.*) *Subject Headings:* **1. Electrophotometric observations 2. Ozone measurement during eclipses 3. Ozone measurement.**—*I.L.D.*

10F–50 551.510.534(789)

Burch, Darrell E. (*Ohio State Univ., Ohio*), **Infrared evidence for the presence of ozone in the lower atmosphere.** *Optical Society of America, Journal*, 46(5):360–361, May **1956.** fig., 6 refs. **DWB, DLC**—An infrared spectrum involving a 20-mi atmospheric path between altitudes of 4300 and 9200 ft (Sacramento Peak, N. Mex., 12:30 p.m., Sept. 14, 1955) was analyzed. The spectrogram shows the same minima at 9.5μ and 9.7μ as those present in solar spectra due to ozone absorption. This indicates the existence of appreciable amounts of ozone below 9000 ft. *Subject Headings:* **1. Ozone absorption spectra 2. Ozone in troposphere 3. Sacramento Peak, N. Mex.**—*G.T.*

10F–51 551.510.534:061.3

Colloquium on Atmospheric Ozone and Circulation in the Lower Stratosphere. *International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept.* 1954, *Scientific Proceedings.* London, Butterworth, **1956.** p. 147–234. **DLC**—Contains all the papers (or summaries) delivered at the Rome meeting of Sept. 1954, along with the discussions, as follows.

Fournier d'Albe, E. M., **Some observations on nocturnal ozone.** p. 149–158. 2 tables, 3 refs., 12 eqs. (For abstract *see* 8.8–184, Aug. 1957, *MAB.*)

Dütsch, H. U., **A daily variation of the total amount of ozone.** p. 159–162. 2 figs., 2 tables, 4 refs. (*See* 8.8–182.)

Chalonge, D., **Mesures d'ozone pendant la nuit.** [Ozone measurements at night.] p. 163–164. —The author states that the determination of the reduced thickness of atmospheric ozone at night can be made from the spectra belonging to the O and B types. The observations made on the Jungfraujoch and at Haute Provence Observatory in general agree with those made at Arosa. In the discussion it is pointed out that for theoretical calculation, day and night variations of the reactions of H and OH with O-atoms must be considered, and the variation of ozone thickness at night and possible mechanism of the phenomenon, etc., are briefly discussed.

Normand, Charles, W. B., **On the European ozone observations 1950–1954.** p. 165–171. 7 figs. (*See* 9.6–144.)

Miyake, Yasuo and Kawamura, K., **Studies on atmospheric ozone at Tokyo.** p. 172–176. 4 figs., 2 tables, 7 refs. (*See* 9.5–134.)

Martin, D. W. and Brewer, A. W., **Some synoptic aspects of the European results.** p. 177–180. fig., table. (*See* 8.8–186.)

Regener, Victor H., **New experimental results on atmospheric ozone.** p. 181–188. 5 figs. (*See* 9.5–136.)

Kay, R. H.; Brewer, A. W. and Dobson, G. M. B., **Some measurements of the vertical distribution of atmospheric ozone by a chemical method to heights of 15 km from aircraft.** p. 189–193. 2 figs., 4 tables, 4 refs. (*See* 9.5–133.)

Khalek, Abdul and Vassy, Arlette, **Mesures relatives à l'ozone atmosphérique en Afghanistan.** [Measurements of atmospheric ozone in Afghanistan.] p. 194–198. 2 figs., 8 refs.—The authors summarize the results of atmospheric ozone measurements in Kabul (Nov. 1950–Dec. 1951) under favorable conditions. Reduced thicknesses varied between 0.46 cm in April and 0.12 cm in June with interdiurnal variability large during April and May and Oct. to Dec. and very small during the remainder of the year. The annual variation of reduced thickness (shown by a graph) has an important maximum during spring and two maxima separated by a pronounced minimum in Oct. and Dec. This annual variation was compared with values obtained at other stations in different parts of the world. The mean temperature of ozone ranged between +12°C in Aug. to −55°C in March with summer being generally warmer than winter. The recorded temperatures are generally higher than those obtained in Europe. The diurnal variation of reduced thickness showed a meridional depression variation similar to that observed at New Delhi. This depression is a maximum during summer and a minimum in winter. The daily variation of mean ozone temperature shows a significant rise reaching a maximum around 14 hrs during all seasons.

Nicolet, Marcel, **Ozone variations above 50 km.** p. 199–200. (*See* 9.5–135.)

Paetzold, H. K., **New experimental and theoretical investigations on the atmospheric ozone layer.** p. 201–212. 9 figs., table, 29 refs. (For abstract from different sources, *see* 7.2–75.)

Gowan, E. H., **Atmospheric ozone over Edmonton (Lat. 53°34′N Long. 113°31′W) 1951–53.** p. 213–214. table. (*See* 9.5–131.)

Dütsch, H. U., **A revised large-scale mixing scheme and its application to the ozone problem.** p. 217–220. 2 figs., 3 eqs.

Also two papers on atmospheric water vapor measurements. *Subject Heading:* **1. Ozone conferences.**—*I.L.D.*

10F–52 541.14:551.510.42:061.3

Conference on Chemical Reactions in Urban Atmospheres, Univ. of Calif. at L. A., Feb. 2–3, 1956, **Proceedings,** ed. by Lewis H. Rogers. Issued in *Air Pollution Foundation, Los Angeles, Report,* Vol. 2, No. 3, i.e., 15, Nov. **1956.** 135 p. figs., tables, refs. **DWB**—Six papers reporting laboratory experiments involving ozone formation and other photochemical processes occurring in Los Angeles smog are presented along with their discussions by conference participants. The titles of the papers are as follows: HAAGEN-SMIT, A. J., **The effect of light on air pollution.** (Photochemical reactions leading to ozone formation.) HAAGEN-SMIT, A. J. and FOX, M. M., **Cumulative test for atmospheric ozone.** (Describes rubber cracking technique of ozone measurement.) CADLE, R. D., **Experimental studies of Los Angeles air and kinetics of atmospheric reactions.** (Reports studies of a) dark reactions that may occur in Los Angeles smog, b) reactions involving smog itself and c) reactions using highly purified L. A. air and simple systems of contaminants.) SCOTT, W. E., **Studies of photochemical reactions with a long-path infrared technique.** (Work at the Franklin Institute, concerning photochemical reactions of nitrogen dioxide and ozone with various hydrocarbons and organic compounds.) CALVERT, J. G., **Photoactivated surface reactions.** (Possible smog-forming reactions on particulate matter.) LEIGHTON, P. A. and PERKINS, W. A., **Rates of photochemical primary processes in urban air.** (An attempt to relate observed diurnal changes in oxidant concentration with calculated rates of oxidant production by photochemical processes and removal by dark processes.) *Subject Headings:* **1. Air pollution conferences 2. Smog 3. Photochemical reactions in urban air 4. Los Angeles, Calif. I. Air Pollution Foundation, Los Angeles II. American Petroleum Institutes III. National Science Foundation IV. Rogers, Lewis H.** (*ed.*). —*G.T.*

10F–53 551.510.534(98)

Douglas, A. E.; Herzberg, G. and Rose, D. C. (*all, Div. of Physics, Nat. Res. Council, Ottawa*), **Atmospheric ozone near the North Pole.** (In: Beer, Arthur (*ed.*), **Vistas in astronomy.** pub. London, **1955–1956.** Vol. 2:874–877. 2 figs., 6 refs.) **DWB, DLC** (520.82 B415v)—During a flight to the North Pole in mid-winter, spectra of the Moon have been taken. They show that, at least on the data of the flight, the amount of ozone at the North Pole was normal, i.e., the same as in Ottawa three weeks later. At the time of the flight, the pole was 1200 km from the nearest place of sunshine in the 50 km layer. *Subject Headings:* **1. Ozone in Arctic 2. Arctic.**—*Authors' abstract.*

10F–54 551.510.534:551.557.3

†Dütsch, H. U., **Das atmosphärische Ozon als Indikator für Strömungen in der Stratosphäre, I. Die photochemischen Grundlagen.** [Atmospheric ozone as an indicator of currents in the stratosphere, Pt. 1, Photochemical basis.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* 9(1):87–119, **1956.** 12 figs., 12 tables, 34 refs., 15 eqs. German, English and French summaries p. 87–88. **DWB**—A radiation chart is developed for evaluating the number of dissociating photons/cm²/sec. With this the ozone distribution, in equilibrium or nonequilibrium, due entirely to photochemical processes is calculated from 15–50 km and 0–80°lat. (summer and

winter) using stratosphere temperatures given by rockets and calculated by PENNDORF. These a compared with rocket and balloon measurements of ozone. They show the course of variation to l expected in an atmosphere without meridional or vertical currents or turbulence. The phot chemically induced diurnal variation, and the nocturnal increase in 50–80 km due to secondary formation from atomic O, are also calculated. (*Same item as* 7.5–105, May 1956, *MAB.*) *Subje Headings:* **1. Ozone variations 2. Stratospheric winds.**—*C.E.P.B.*

10F–55 551.501.71:551.510.5

Epstein, Edward S.; Osterberg, Charles and Adel, Arthur, **A new method for the determinatio of the vertical distribution of ozone from a ground station.** *Journal of Meteorology*, 13(4):319–33 Aug. **1956.** 12 figs., 4 tables, 20 refs., 11 eqs. **DWB**—A surface method termed ERTOR (effecti radiation temperature of ozone region) is described for finding the vertical distribution of ozone b UV determination of total, and absorption and radiation in infrared. The theory is discussed detail, including the assumed stratification of the atmosphere. The technique of applying it set out with examples. Isopleths of ozone densities 0–45 km over Flagstaff, Ariz., Feb. 1–Aug. 2 1955, are plotted. Mean values of center of gravity and monthly mean distributions show a marke seasonal change (mean height Feb., 20 km, Aug., 27 km; amount greatest in April–May). Th center of gravity descends during passage of upper troughs. There is a marked tendency for lar density of ozone near the surface to be associated with low surface pressures and frontal passage (*Same item as* 7.11–103, Nov. 1956, *MAB.*) *Subject Heading:* **1. Vertical ozone distribution measur ment.**—*C.E.P.B.*

10F–56 551.501.71:551.510.5

Epstein, Edward S.; Osterberg, Charles and Adel, Arthur, **Note on the variations of atmospher ozone as a function of height.** *Journal of Atmospheric and Terrestrial Physics*, London, 8(6):347–34 June **1956.** fig., 2 refs. **DWB**—Ozone amounts above Flagstaff, Ariz., Feb.–Aug. 1955, measure from the ground by a new method (VODARO) are plotted for height intervals 2–11.25–16.25–21.2 27.5–32.5 km and above 32.5. They agree well with results of H. K. PAETZOLD. (*Same item* 7.10–128, Oct. 1956, *MAB.*) *Subject Headings:* **1. Ozone research 2. Vertical ozone distributio I. Paetzold, H. K.**—*C.E.P.B.*

10F–57 551.510.534:551.524

Epstein, Edward S. and Adel, Arthur, **Rates of temperature change in the atmosphere due radiation in the 9.6 micron band of ozone.** Arizona State College, Contract AF 19(122)-19 Scientific Report HA-10, Sept. 1, **1956.** 23 p. 3 figs., 6 tables, 7 refs., 7 eqs.—Rates of temperatu change due to radiation by ozone in the 9.6 micron band have been computed for each month 1955. The mean monthly ozone distributions employed in the computations are based on 1 daily distributions which were computed by the VODARO method from observations made at t Atmospheric Research Observatory, Flagstaff, Ariz. The results agree well with those of PLAS who used three assumed distributions. The principal contribution of the present study lies in i use of actual distributions. The principal seasonal variation in the rates of temperature chan occurs just below 25 km, where marked warming (more than 1K day $^{-1}$) exists in the summe Computations have also been carried out to indicate the effect of maximum ozonospheric temper tures on the stratospheric cooling rates, and the rapidity with which conditions of equilibrium a approached. The methods by which the computations are made are described. *Subject Heading* **1. Ozonosphere temperatures 2. Temperature changes 3. Ozone distribution 4. Flagsta Ariz.**—*Authors' abstract.*

10F–58 551.510.5

Epstein, Edward S. and Adel, Arthur, **VODARO results for 1955 at the atmospheric Researc Observatory, Flagstaff, Arizona.** Arizona State College, Contract AF 19(122)-198, Scientific Repo HA-9, Sept. 1, **1956.** 31 p. almost entirely tables, 3 refs., eqs.—Vertical ozone distributions abo the Atmospheric Research Observatory at Flagstaff, Ariz., have been determined for a total of 1 days in 1955. The results are presented in tabular form. *Subject Headings:* **1. Vertical ozo distribution 2. Flagstaff, Ariz.**—*Authors' abstract.*

10F–59 551.510.534:523.78(54

Fournier d'Albe, E. M. and Rasool, Ishtiaq (*both, Geophysical Observatory, Quetta, Pakista* **Observations de l'ozone atmosphérique pendant une éclipse totale du soleil.** [Observations atmospheric ozone during a total eclipse of the sun.] *Annales de Géophysique*, Paris, 12(1):72–7 Jan./March **1956.** 2 figs., 2 tables, 3 refs., 7 eqs. English and Spanish summaries p. 72. **DLC** Observations made by a Dobson spectrophotometer failed to reveal significant changes during t solar eclipse of June 1954. An explanation is proposed for the rapid increase of ozone amou after sunset and the lack of a similar effect during an eclipse. *Subject Headings:* **1. Ozone observ tions 2. Solar eclipses 3. Quetta, Pakistan.**—*A.A.*

10F–60 551.510.41:551.510.534:551.521.18

Goody, R. M. and Roach, W. T., **Determination of the vertical distribution of ozone from emission spectra.** *Royal Meteorological Society, Quarterly Journal*, 82(352):217–221, April **1956.** 3 figs., tables, 6 refs., 6 eqs. **DWB**—This note describes a method of finding the vertical distribution of ozone by combining spectrographic mean pressure measurements on the 9.6μ band (Walshaw and Goody: *Ibid.*, p. 177–186, *see* 10F–89) with emission measurements. Epstein, Ostenberg and Adel (1955) have recently given details of a similar method. There are many differences between the two, both in technique and interpretation, but the important conclusion in each case is that valuable information can be obtained from this type of measurement. (*Same item as* 7.9–124, Sept. 1956, *MAB.*) *Subject Headings:* **1. Ozone layer measurement 2. Vertical ozone distribution.** —*Authors' abstract.*

10F–61 551.510.534

Goody, R. M. and Walshaw, C. D. (*both, Cavendish Lab., Cambridge, England*), **The ozone layer: An investigation of the 9.6μ ozone band in the telluric spectrum.** (In: Beer, Arthur (*ed.*), **Vistas in Astronomy.** pub. London, **1955–1956.** Vol. 2:870–874. 2 figs., 4 refs.) **DWB, DLC** (520.82 B415v)—A series of observations on the 9.6μ ozone band in the solar spectrum made during spring, summer, and autumn, 1952, have been interpreted in terms of the height of the ozone layer. It is found that the average height is 18 km but that it varies seasonally with a minimum of 15 km at the beginning of August, and that there is a positive correlation between departures of the height and the ozone amount from their running mean values. These two results are critically discussed in relation to possible systematic errors, and it is tentatively concluded that they are significant. It is also shown that they need not conflict with existing observational evidence. Observations have been continued through 1953 and it is hoped that these will lead to more definite conclusions. *Subject Heading:* **1. Ozone layer height.**—*Authors' abstract.*

10F–62 551.510.534

Gowan, E. H.; Buckler, S. J. and Thompson, C. E., **Preliminary report on ozone changes 1950–1954 over Edmonton.** *Royal Meteorological Society, Canadian Branch* [*Publications*], 7(2):37–65, Oct. 18, **1956.** 20 figs., table, 7 refs. **DWB**—An excellent analysis of ozone measurements made with a Dobson ozone spectrophotometer at Edmonton during Aug. 1950–1954 shows relations between ozone anomalies or changes and 50 mb troughs, ridges, Hudson Bay Lows and Alberta (cold) Lows. Composite seasonal charts show that increases or high values usually correspond with troughs, where subsidence is at a maximum or the region just upstream from the 500 mb trough where advection of air from the ozone rich region around 60°N is at a maximum and that O_3 minima occur in ridge areas or well in advance of troughs (also ridge areas), where advection is from the south. Cold Alberta lows are not associated with high O_3 values, as they are too small and transitory to allow much advection. Low tropopause seems to coincide with high O_3 values. Seasonal curves for Edmonton for 1951–54 seem to agree with those for Oxford (Normand) and for Bismarck (1953–54). The highest values occur in March–April and the lowest in Oct.–Nov. Umkehr calculations show greatest amount in 5–20 km height range (.0078 cm/km). No significant advection could be shown between Edmonton and Bismarck, but data are limited. (*Same item as* 8.8–20, August 1957, *MAB.*) *Subject Headings:* **1. Ozone-500 mb height relationships 2. Ozone advection 3. Vertical ozone distribution 4. Seasonal ozone variations 5. Edmonton, Alberta 6. Bismarck, N. D.**—*M.R.*

10F–63 551.510.42:541.14

Haagen-Smit, A. J. (*Calif. Inst. Tech.*), **Atmospheric reactions of air pollutants.** *Industrial and Engineering Chemistry*, Wash., D. C., 48(12):65A–70A, Dec. **1956.** 2 figs., 7 refs. **DLC**—The photochemical reactions leading to the formation of ozone through the oxidation of organic compounds are discussed. From ozone concentrations of 0.5 p.p.m. measured in the Los Angeles area it is estimated that there must have been 500 tons of ozone in the Basin and that at least 2000 tons of ozone have to be produced to maintain such an amount for several hours. The chain reaction type of photochemical reaction is partly credited with this high rate of ozone production. *Subject Headings:* **1. Ozone photochemistry 2. Los Angeles, Calif.**—*G.T.*

10F–64 551.510.42:541.14

Haagen-Smit, A. J. and Fox, M. M., **Ozone formation in photochemical oxidation of organic substances.** *Industrial and Engineering Chemistry*, 48(9, Pt. 1):1484–1487, Sept. **1956.** 4 figs., table, 9 refs., **DLC**—Amount of ozone formation from organic compounds (hydrocarbons, alcohols, aldehydes, ketones, etc.) and nitrogen dioxide in oxygen was measured in the laboratory under irradiation with blue fluorescent light. Results of the experiments are tabulated and graphically presented in terms of rubber cracking. Olefins, alcohols and aldehydes are identified as the most active among the ozone-forming organic compounds. *Subject Headings:* **1. Ozone photochemistry 2. Rubber cracking.**—*G.T.*

10F–65 551.521.12:551.510.534

Héjjas, A., **Ozonbestimmung aus Aktinometermessungen.** [Ozone determination from actinometer measurements.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B,* Vienna, 7(2):212–222, 1956. 5 figs., 4 tables, 4 refs., 16 eqs. German, English and French summaries p. 212. **DWB**—It is shown that by measuring the intensity of solar radiation in three narrow bands of the visible spectrum separated by the Schotts coloured glass filters: GG 7, OG 1, OG 2, RG 2 and RG 5, where practically only Rayleigh-scattering, aerosol extinction and ozone absorption occur, it is possible to determine the total amount of ozone above the station and the Ångström parameter of the aerosol extinction. The error of this simplification is found to be negligible. The procedure with slide-rule and nomographs which permit the fast and simple calculation, is described. (*Same item as* 7.9–160, Sept. 1956, *MAB.*) *Subject Heading:* **1. Ozone measurement techniques.**—*Author's abstract.*

10F–66 551.521.17:551.510.534

Horiuchi, G. (*Aerological Obs., Tateno*), **Ultra-violet absorption in the oxygen atmosphere.** *Geophysical Magazine,* Tokyo, 27(2):293–299, March **1956.** 2 figs., 30 refs., 12 eqs. **DWB, DLC**—The equilibrium of O_3 and O particles is recalculated by means of photochemical theory from several parameters recently published. A little larger concentration than ever is found for the upper mesosphere. Then the energy of ultra-violet absorption in the oxygen atmosphere is estimated. It is concluded that the secondary maximum of possible heating occurs at about the 65 km level and is mainly due to O_3 absorption. (*Same item as* 8.4–207, April 1957, *MAB.*) *Subject Headings:* **1. Ozone absorption 2. Ultraviolet absorption.**—*From author's abstract.*

10F–67 551.510.534:535.34

Kaplan, L. D.; Migeotte, M. V. and Neven, L., **9.6-micron band of telluric ozone and its rotational analysis.** *Journal of Chemical Physics,* 24(6):1183–1186, June **1956.** fig., refs., 2 eqs. **DLC**—The 9.6-micron band of atmospheric ozone has been investigated by means of high resolution measurements of the solar spectrum from the Jungfraujoch in Switzerland. A rotational analysis confirms its assignment as the V_3 fundamental and results in the following values for the vibrational frequency and rotational constants:

$$V_3 = 1042.1_6\ \text{cm}^{-1}, \quad A = 3.50_2\ \text{cm}^{-1}, \quad B = 0.440_1\ \text{cm}^{-1}, \quad C = 0.388_3\ \text{cm}^{-1}.$$

The decrease of all three rotational constants relative to the ground-state values suggests an appreciable Coriolis interaction with the V_1 fundamental. *Subject Headings:* **1. Ozone spectroscopy 2. Rotational ozone spectrum.**—*Authors' abstract.*

10F–68 551.510.534:546.214(52)

Kawamura, K. (*Met. Res. Inst., Tokyo*), **Results of the observation of atmospheric ozone at Tokyo.** *Meteorological Society of Japan, Tokyo, Journal, Ser.* 2, 34(4):231–234, Aug. **1956.** 3 figs., table, 7 refs. In Japanese; English summary p. 231. **DWB, DLC**—The amount of atmospheric ozone was observed at Tokyo during the period from June 1953 to Sept. 1955, using a cadmium photoelectric tube and a glass filter. The observations were made at about 11 a.m. on the day when there was no cloud in the direction of the sun. During this period, 217 independent observations were obtained and their absolute values were determined by a series of comparative observation with Dobson spectrophotometer (No. 52) for the period April through Sept. 1955. With this comparative observation, it was ascertained that by the present method the amount of ozone can be measured with good accuracy. The amount of ozone shows a marked seasonal variation in respective years having the maximum value in spring and the minimum in autumn. The course of annual ozone variation and its absolute value agree well with the result obtained at Washington, D. C., in 1948–1950 by S. Fritz. (*Same item as* 9.5–132, May 1958, *MAB.*) *Subject Headings:* **1. Ozone amount 2. Ozone observations 3. Annual ozone variations 4. Tokyo, Japan.**—*Author's abstract.*

10F–69 551.510.534:016

†Khvostikov, I. A., **Ozon v stratosfere.** [Ozone in the stratosphere.] *Uspekhi Fizicheskikh Nauk,* Moscow, 59(2):229–323, **1956.** 64 figs., 10 tables, 134 refs., eqs. **DLC**—An extremely thorough review of the world's literature on stratospheric ozone measurement and distribution, based on a lecture given by the author in Dec. 1955 at Tiflis Univ. Theory, indirect methods (absorption by earth's atmosphere, lunar eclipse measurements) and direct measurements (rocket and balloon soundings), photochemical theory of ozone and ozonosphere formation, theoretical calculations of the vertical ozone distribution, solar-ozone and ozone-weather relations, heat balance of ozonosphere, use of ozone as a conservative property of air masses or for tracing flow patterns, influence on atmospheric processes of ozonosphere heating and absorption, on winds and pressures in the ozonosphere, long period and seasonal and regional variations and possible effect on and of climatic changes are reviewed. The latest literature cited in the excellent bibliography is 1956

Variations are shown graphically. *Subject Headings:* **1. Ozonosphere 2. Ozone bibliographies.**—*M.R.*

10F–70 551.521.18:551.510.534

Kondrat'ev, K. Ia., **Luchistyĭ teploobmen v atmosfere.** [Radiant heat exchange in the atmosphere.] Ed. by P. N. Tverskoĭ. Leningrad, Gidrometizdat, **1956.** 419 p. 105 figs., 71 tables, 490 refs., eqs. **DLC** (QC 880.K63)—On p. 134 the author takes up the absorption of long-wave radiation by atmospheric ozone. The various bands of the infrared absorption spectrum of ozone are briefly discussed. It is shown that the ozone absorption coefficient at 9.65μ is directly proportional to the 4th root of pressure and further, that it decreases exponentially with altitude. At normal pressure and temperature the absorption coefficient is $k \approx 5$ 1/cm. The width of the 9.65μ band is 0.5μ (9.4–9.9μ). (For abstract on the whole book, *see* 8.7–8, July 1957, *MAB.*) *Subject Headings:* **1. Infrared absorption spectrum 2. Ozone absorption coefficients.**—*G.T.*

10F–71 551.510.534:08

Langlo, K., **Symposium on atmospheric ozone.** *World Meteorological Organization, WMO Bulletin*, 5(4):161–163, Oct. **1956.** photo. **DWB**—Symposium was held on June 25–28, 1956 at the Town Hall in Ravensburg, Germany, at invitation of International Ozone Commission (estab. by IUGG, Int. Assoc. of Met.) and organized by the Max-Planck Institut für Physik der Stratosphäre (in Weissenau). Bartels, Ramanathan, K. Langlo, S. Fritz and Dobson led sessions devoted to chemical methods of ozone determination, records, IGY networks, inspection of stations, Umkehr effect, etc. At present 50 Dobson instruments are in use in various parts of the world. (*Same item as* 9.5–38, May 1958, *MAB.*) *Subject Headings:* **1. Ozone symposia 2. IGY ozone networks 3. Ravensburg, Germany.**—*M.R.*

10F–72 551.510.53:523.38

†Link, František, **Die Mondfinsternisse.** [Lunar eclipses.] Leipzig, Akademische Verlagsgesellschaft Geest & Portig, **1956.** 127 p. 49 figs., 20 tables, 192 refs., eqs. *Probleme der kosmischen Physik*, Leipzig, Vol. 28. **Review** by R. M. Goody in *Meteorological Magazine*, London, 86(1023): 283–284, Sept. **1957. Review** by F. Steinhauser in *Archiv. für Meteorologie, Geophysik und Bioklimatologie*, Ser. A, 10(2/3):276, **1958.**—The main purpose of this monograph is to review measurements and theories (including the author's own) concerning the use of lunar eclipse observations (and in particular photometric observations of the rim of the earth's shadow) for exploring the earth's atmosphere. Theoretical calculations and quantitative data are presented on light intensities in the lunar shadow and penumbra, light transmission through the earth's atmosphere, and distribution of light intensity on the solar disk. Light intensity distribution on the moon during eclipses is interpreted in terms of air masses, cloudiness, ozone absorption, meteoric dust, etc., and examples are given of such meteorological analysis of lunar eclipses by means of isophot charts. Special observations made during lunar eclipses, such as those on lunar temperature, luminescence of the lunar surface, ionospheric variations, etc., are also discussed. *Subject Headings:* **1. Vertical ozone distribution 2. Lunar eclipses 3. Upper atmosphere research 4. Atmospheric transmission.**—*G.T.*

10F–73 551.510.41:546.214

Littman, F. E.; Ford, H. W. and Endow, N. (*all, Stanford Res. Institute, Pasadena*), **Formation of ozone in the Los Angeles atmosphere.** *Industrial and Engineering Chemistry*, 48(9, Pt. 1):1492–1497, Sept. **1956.** 16 figs., table, 6 refs. **DLC.** Also in: *Air Pollution Control Association, Journal*, 6(3):171–175, Nov. **1956.** 16 figs., 2 tables, 5 refs. **DLC**—Oxidant formation in L. A. atmosphere is explained by the assumption that ozone is formed by nitrogen dioxide photolysis aided by rapid conversion of nitric oxide to nitrogen dioxide in the presence of certain hydrocarbons. The quantitative aspects of such systems are under investigation. *Subject Headings:* **1. Ozone formation 2. Nitrogen oxide photolysis 3. Los Angeles, Calif.**—*Authors' abstract.*

10F–74 551.510.41:546.214

Littman, Fred E. and Marynowski, C. W., **Identification of ozone in the Los Angeles atmosphere.** *Analytical Chemistry*, Wash., D. C., 28(5):819–825, May **1956.** 6 figs., 9 tables, 9 refs. **DLC**—Although the oxidant occurring in the Los Angeles atmosphere resembles ozone in its properties, its true identity has been the subject of much discussion. Because the analytical methods commonly used are not entirely specific for ozone, a technique was employed which utilized silica gel at the temperature of liquid oxygen for the concentration of ozone. The adsorbed gases were flushed into an optical cell and their ultraviolet spectrum was recorded. The resulting spectrum was compared with the spectra of synthetic ozone-oxygen mixtures. The results indicate that the material retained on and desorbed from silica gel was ozone. The quantities recovered account for 30 to 45% of the total oxidant. The remainder may well be handling losses, or another oxidant, or both. *Subject Headings:* **1. Ozone determination 2. Los Angeles, Calif.**—*Authors' abstract.*

10F–75 551.510.41:546.214

Mader, Paul P.; Heddon, Merlyn W.; Eye, Marcel G. and Hamming, Walter J. (*all, L. A. County Air Pollution Control District*), **Effects of present-day fuels on air pollution.** *Industrial and Engineering Chemistry*, 48(9, Pt. 1):1508–1511, Sept. **1956.** 4 tables, 10 refs. **DLC**—Contains brief paragraph with the statement that, among the hydrocarbons, 2-heptene and 2-methyl-1-butene were most active in the formation of ozone. *Subject Heading:* **1. Ozone formation.**—*G.T.*

10F–76 551.510.534/5:550.38

*Malurkar, S. L., **Solar geomagnetic ionospheric and ozone data.** *Indian Journal of Meteorology and Geophysics*, Delhi, 7(1):75–83, Jan. **1956.** Mostly tables (incl. fold.). **DWB, DLC**—Daily relative sunspot numbers, daily areas of calcium prominences, of H-Alpha dark markings, hourly median values of critical frequency and visual height of ionospheric layers, principal magnetic storms for Kodaikanal and magnetic data for Alibag (Bombay). Daily ozone data (in cm atmosphere) for New Delhi, Mt. Abu and Gulmarg at 16 or 17h from direct sun observation in 3112/3323 and 4536/3323 Å are given for July, Aug. and Sept. 1955 in this issue, and in corresponding sections in previous and subsequent issues, along with state of sky at time of each observation. *Subject Headings:* **1. Geomagnetic data 2. Ionospheric data 3. Ozone data 4. India.**—*M.R.*

10F–77 551.510.534

Martin, David W., **Contributions to the study of atmospheric ozone.** Massachusetts. Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1000, Scientific Report No. 6, Sept. 15, **1956.** 52 p. 4 tables, 51 refs., eqs. Reprinted in its Final Report, Dec. 31, **1957.** p. 150–202. **DWB**—Hitherto photochemical theories have failed to account for the observed variations of ozone over the globe, and it is generally accepted that a comprehensive theory of these variations must rely on a discussion of dynamic processes in the atmosphere. Following a summary of observational data, these dynamic processes are analyzed here in two ways: firstly, by the synoptic study of recent upper air data, information is obtained on the mechanisms of the day to day ozone changes; and secondly, a statistical examination is made of the same basic data to indicate how the movements of the atmosphere may transport ozone on a very large scale, and so cause the seasonal and global distributions. (*Same item as* 8.8–185, August, 1957, *MAB.*) *Subject Heading:* **1. Ozone variations.**—*Author's abstract.*

10F–78 535.34:551.510.534

Nexsen, William E., Jr., **Measurement and analysis of the rotational fine structure of the ν_3 fundamental of ozone.** Ohio. State Univ. Research Foundation, Contract AF 19(604)-1003, Scientific Report, No. 1, Jan. **1956.** 46 p. 7 figs., 6 tables, 21 refs., 9 eqs. **DWB**—The 705 cm^{-1} ν_2 fundamental of ozone has been investigated with a high resolution vacuum spectrometer. The sample was contained in a multiple traversal cell which gave an absorption path of eight meters. Over 300 absorption maxima were measured in the region from 787 cm^{-1} to 656 cm^{-1}. The band exhibits the properties of a perpendicular band of an almost symmetric rotator. The molecular constants obtained from analysis of the band are $\nu_0 = 701.42 \pm 0.04$ cm^{-1}, $A_{[010]} = 3.5934 \pm 0.0004$ cm^{-1}, $B_{[010]} = 0.4300 \pm 0.001$ cm^{-1}, $C_{[010]} = 0.4058 \pm 0.0004$ cm^{-1}, $\kappa = -0.9848 \pm 0.001$. The 1110 cm^{-1} ν_1 fundamental also has been investigated. Almost 200 absorption maxima were measured in the region 1180 cm^{-1} to 1070 cm^{-1}. No attempt was made to analyze this band. *Subject Heading:* **1. Ozone spectroscopy.**—*Author's abstract.*

10F–79 551.510.534:546.214

Pokrovskiĭ, V. N., **K metodike vychisleniia vertikal'nogo raspredeleniia ozona v atmosfere.** [Method of figuring the vertical distribution of ozone in the atmosphere.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 16:21–25, **1956.** 4 refs., fig., 14 eqs. **DLC**—An attempt to develop the theory for computing the vertical distribution of ozone in the atmosphere, when data on the spectral intensity of solar radiation beyond the atmosphere limits are not available (the spectral instrument did not reach the upper limits of the ozone layer), is presented. (*Same item as* 9.6–145, June 1958, *MAB.*) *Subject Heading:* **1. Vertical ozone distribution.**—*A.M.P.*

10F–80 551.510.534:551.513.1:546.214

†Ramanathan, K. R., **Atmospheric ozone and the general circulation of the atmosphere.** *I.U.G.G. Association of Meteorology, Rome, Sept.* 1954, *Scientific Proceedings*. London. Butterworth, **1956.** p. 3–24. 17 figs., table, 33 refs. **DLC**—In this presidential address, the author reviews the basic knowledge of ozone distribution and theories connected with atmospheric ozone and weather of circulation patterns. His own work as well as that of many other authors is incorporated. Height, latitudinal, seasonal, air mass, surface, stratospheric, day-to-day, and synoptic variations in amount of ozone or in production and distribution or conservation of O_3 are systematically discussed. A table, based on Mt. Abu data showing the variations in 9 km layers to 54 km

with variations in total O_3, shows that the 18–27 km layer provides the bulk of the increase when an increase in total ozone is observed, though the lower levels also contribute substantially to the increase. (*Same item as* 7.6–103, June 1956, *MAB.*) *Subject Headings:* **1. Ozone variations 2. Atmospheric circulation 3. Mount Abu, India.**—*M.R.*

10F–81 551.510.41:546.214:551.508.952

Rasool, Ishtiaq; Vassy, A. and Leroy, B., **Comparaison des méthodes chimique et spectrographique de dosage de l'ozone au voisinage du sol.** [Comparison of the chemical and spectrographic methods of measuring ozone near the ground.] *Annales de Géophysique*, Paris, 12(4):239–244, Oct./Dec. **1956.** fig., 2 tables, 8 refs., eqs. **DLC**—Simultaneous measurements of surface ozone made with a spectrographic and a chemical method show that values obtained with the latter are too low in still air, due to the depletion of ozone near the instrument as ozone is retained in the apparatus. *Subject Heading:* **1. Ozone measurement techniques.**—*G.T.*

10F–82 551.510.41:546.214:551.508.952:535.243

Rasool, I., **Mesures simultanées de l'ozone atmosphérique par spectrophotométrie photographique et avec l'appareil Dobson par temps nuageux.** [Simultaneous measurements of atmospheric ozone by means of spectrophotography and with Dobson's instrument during cloudy weather.] *Journal Scientifique de la Météorologie*, Paris, 8(31):107–110, July/Sept. **1956.** fig., table. French, English and Spanish summaries p. 107. **DLC**—Simultaneous measurements of ozone were made by the standard method of photographic spectrophotometry and by Dobson's spectrophotometer. The results show a good agreement of the values obtained by the two methods when the sky is clear; but for cloudy zenith a selective absorption was found to exist in the Huggins band. This result reflects on the reliability of values obtained by Dobson's spectrophotometer with cloudy sky because the correction for clouds is made by comparing the measurements on only two pairs of wavelengths. A table is given which shows the unreliability of the values obtained by Dobson's apparatus with cloudy sky. *Subject Headings:* **1. Ozone measurements 2. Spectrophotometric ozone determination 3. Dobson spectrophotometer.**—*Author's abstract.*

10F–83 551.510.534:551.510.41:546.214

Rasool, I., **Relation entre l'épaisseur réduite de l'ozone atmosphérique et sa concentration au niveau du sol.** [Relation between the reduced thickness and the surface concentration of atmospheric ozone.] *Académie des Sciences, Paris, Comptes Rendus*, 242(17):2168–2171, April 23, **1956.** fig., table, 4 refs. **DLC**—Continuous recordings of ozone concentration at the ground surface are compared day by day with total ozone values, without any significant correlation showing between the two values. A negative correlation is found between amount of ozone at the surface and the number of cases of inversion. Seasonal variations of surface and total ozone are analogous but surface ozone has an additional minimum in June when the wind blows from the metropolitan area of Paris. (*Same item as* 8.3-144, March 1957, *MAB.*) *Subject Headings:* **1. Ozone distribution 2. Ozone near the ground.**—*Trans. of author's abstract.*

10F–84 551.501:546.214:551.510.41

Rasool, I. and Vassy, Arlette, **Remarques sur les méthodes chimiques de dosage de l'ozone atmosphérique.** [Remarks on the methods of chemical sampling of atmospheric ozone.] *Académie des Sciences, Paris, Comptes Rendus*, 243(3):298–299, July 16, **1956.** table, 5 refs. **DLC**—Atmospheric ozone concentration near the ground was measured by two methods: chemical sampling and optical measurement. A comparison of the results shows that chemical sampling is accurate in itself, even at very low concentrations, but difficulties arise from poor exchange of air in the absence of wind. (*Same item as* 8.8–122, Aug. 1957, *MAB.*) *Subject Heading:* **1. Ozone measurement techniques.**—*Trans. of authors' abstract.*

10F–85 551.510.42

Renzetti, N. A. and Romanovsky, J. C., **Comparative study of oxidants in the Los Angeles atmosphere.** *Air Pollution Control Association, Journal*, 6(3):154–159, Nov. **1956.** 13+ figs., table, 20 refs., eqs. **DLC.** Also in: *Air Pollution Control Association*, 49th *Meeting*, 1956, *Buffalo, N. Y., Proceedings.* Issued **1957.** Sec. 21 (28 p.). 13 figs., 20 refs. **DWB** (M10.42 A298ap)—Results of comparative measurements of oxidants made from July to Nov. 1955 with four different methods (potassium iodide, rubber cracking, phenolphthalin and infrared spectrometry) are presented graphically and analyzed. *Subject Headings:* **1. Atmospheric pollution measurement 2. Los Angeles, Calif.**—*G.T.*

10F–86 523.77:535.34:551.510.534

Shaw, J. H., and Cummins, H. Z., **The solar spectrum from 4.5μ to 5.3μ as observed at Columbus, Ohio.** Ohio. State Univ. Research Foundation, Contract AF 19(604)-1003. Scientific Report, No. 2, **1956.** 23 p. 10 figs., table, 10 refs.—A high-resolution map of the solar spectrum covering

the region from 4.5μ to 5.3μ is presented, together with a list of line frequencies. Although the general appearance of the spectrum is similar to that obtained in an earlier study, many new weak lines have been observed. Some of these lines are believed to be caused by CO in the solar atmosphere and some by ozone in the earth's atmosphere. *Subject Headings:* **1. Solar spectrum 2. Ozone spectroscopy.**—*Authors' abstract.*

10F–87 551.551:551.557:551.510.534/5

Slater, Alan E., **Turbulence above the ozone layer.** *British Interplanetary Society, Journal*, 15(1):1–7, Jan./Feb. **1956.** 3 figs., 19 refs. **DLC**—It has been stated that a winged vehicle traveling through the upper atmosphere between 50 and 80 km will experience turbulence due to convection currents set up by the hot ozone layer at about 50 km. The evidence for this turbulence is examined and found to be contradictory, mainly because temperature data from many rocket ascents do not show a sufficient fall-off of temperature with height to allow convection to develop. Assuming that there is turbulence, the probable pattern of the convection currents is discussed. Uniform heating should give a regular pattern with the spacing between up-currents equal to two and a half times the thickness of the convection layer. Changes of wind with height should cause the vertical currents to be elongated in the direction of the wind shear, so that a vessel flying parallel to the shear could remain in either an up current or a down current for a considerable distance. Finally, the probable speed of the vertical currents is discussed. Their speed would need to attain several hundred m per second to affect noticeably a winged vessel travelling at 6 km/sec. Rough calculation shows that, to attain even 100 m/sec., an up current would have to rise through 30 km while remaining some 10°C hotter than the surrounding air. Such a large temperature excess appears unlikely. (*Same item as* 9.9–208, Sept. 1958, *MAB.*) *Subject Headings:* **1. High level turbulence 2. Turbulence above ozone layer.**—*Author's abstract.*

10F–88 551.510.41:546.214

*Teichert, F. and Warmbt, W., **Ozonmessungen Dresden-Wahnsdorf und Fichtelberg 1954/55.** [Ozone measurements at Dresden-Wahnsdorf and Fichtelberg, 1954/55.] *Zeitschrift für Meteorologie*, 10(9):264–277, Sept. **1956.** 7 figs., 9 tables, 10 refs. **DLC**—Measurements at Wahnsdorf (Dresden) 1952–55, Fichtelberg (mountain station) 1954–55 and a number of other stations in 1955 are discussed. The annual average was: Wahnsdorf 12.4–8.3 γ/m^3, Fichtelberg 42.3–35.0. Monthly means varied considerably with thermal processes of weather; maximum was in spring and early summer, minimum in fall and early winter. At Fichtelberg the annual range was great, the amount being 4 times Wahnsdorf in summer and 8 times in winter. Curves or tables show annual variation at different hours, and diurnal variation with different types of weather and different wind directions. At Wahnsdorf the diurnal variation is related to vertical austausch. (*Same item as* 9.2–179, Feb. 1958, *MAB.*) *Subject Headings:* **1. Ozone measurements 2. Germany.**—*C.E.P.B.*

10F–89 551.510.41:551.510.534:551.521.18

Walshaw, C. D. and Goody, R. M., **An experimental investigation of the 9.6μ band of ozone in the solar spectrum.** *Royal Meteorological Society, Quarterly Journal*, 82(352):177–186, April **1956.** 5 figs., table, 15 refs., eq. **DWB**—STRONG's (1941) method of using the 9.6μ vibration-rotation band of ozone to measure the effective mean pressure of the ozone layer was applied over 2 years at Cambridge, Eng. Experimental procedure is described. The daily mean values of effective ozone height and ozone amount are plotted and discussed; effect of water vapor and temperature is negligible. The mean height is 18–19 km (ICAN); there is a seasonal variation with an annual range of 3.4 km and a minimum in summer which is attributed to greater convection at that season in the troposphere and lower stratosphere. Short period variations are due almost entirely to random errors. (*Same item as* 7.9–127, Sept. 1956, *MAB.*) *Subject Headings:* **1. Ozone layer measurement 2. Ozone variations 3. Cambridge, Eng.**—*C.E.P.B.*

10F–90 551.510.41:551.521.18

Wormell, T. W. (*Cavendish Lab., Cambridge, England*), **The infra-red spectrum of the earth's atmosphere.** (In: Beer, Arthur (*ed.*), **Vistas in astronomy.** pub. London, **1955–1956.** Vol. 2:863–869. 3 figs., 30 refs., eqs.) **DWB, DLC** (520.82 B415v)—The results of the intensive study of the infra-red absorption spectrum of the earth's atmosphere, which has proceeded during the last few years, are briefly reviewed and the potentialities of this method for determining the amount and the vertical distribution of rare polyatomic constituents are discussed. *Subject Headings:* **1. Infrared absorption spectrum 2. Atmospheric composition.**—*Author's abstract.*

1957

10F–91 551.510.41:551.508.952:551.507.352

Brewer, A. W., **Ozone-concentration measurements from an aircraft in N. Norway.** *Royal Meteorological Society, Quarterly Journal*, 83(356):266–268, April **1957.** 4 figs., ref. **DWB.** Also

issued as: *Great Britain. Meteorological Research Committee, M.R.P.*, 946, Nov. 22, 1955. 3 p. 4 figs., ref. Mimeo.—An ozone sampler, thermometer and dew point hygrometer were carried to 40,000 ft on 4 ascents (June 24–July 12, 1955) near Tromsö. Ozone concentration increased at the tropopause. (*Same item as* 8.8–179, Aug. 1957, *M.A.B.*) *Subject Headings:* **1. Vertical ozone distribution 2. Tromsö, Norway.**—*C.E.P.B.*

10F–92 551.508.952

Dobson, G. M. B., **Observers' handbook for the ozone spectrophotometer.** *International Geophysical Year*, 1957/1958, *Annals*, Vol. 5, (IGY Instruction Manual), Pt. 1, pub. London, Pergamon Press, **1957.** p. 46–89. 14 figs., tables, 5 eqs. Also his **Adjustment and calibration of ozone spectrophotometer.** *Ibid.*, p. 90–114. 25 figs., 2 tables. **DWB** (M06.22 I61ann)—The instrument is described and shown in a photograph and diagrams. Detailed instructions are given for making measurements under various conditions, for calculating the ozone amount, for testing, calibration and maintenance. *Subject Headings:* **1. Ozone spectrophotometers 2. Instrument manuals.**—*G.T.*

10F–93 551.510.534:551.510.31:681.14:621.38

*Dütsch, Hans U. (*Lightklimatisches Observatorium, Arosa*), **Evaluation of the Umkehr effect by means of a digital electronic computer.** Contract AF 61(514)-905, Scientific Report, No. 1, Aug. 1, **1957.** 30 p. 4 figs., 10 tables, 15 refs. **DWB** (M10.534 D879e)—Tables, based on theory and on 500 Umkehr curves obtained at Arosa with a Dobson spectrophotometer since Dec. 1955, have been compiled to use in electronic computer analysis of vertical ozone distribution. Errors due to linearisation have been reduced by successive approximation of second order terms so that remaining errors are about the same as the standard error of approximation. Details of the method (using 9 layers) and the computations as well as the useful tables are presented in the text. *Subject Headings:* **1. Umkehr effect evaluation 2. Electronic computer analysis of ozone distribution 3. Dobson spectrophotometer.**—*M.R. and author's abstract.*

10F–94 551.510.534:546.214

Gushchin, G. P., **K voprosu ob izmerenii obshchego soderzhaniia atmosfernogo ozona i ego vertikal'nogo raspredeleniia.** [The measurement of the total content of atmospheric ozone and its vertical distribution.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:26–32, June **1957.** 4 figs., 3 tables, 9 refs., 3 eqs. **DWB**—This study of the vertical distribution of ozone is based upon observations made during 1953–1956 in connection with preparation for the IGY at the Atmospheric Optics Laboratory of the A. I. Voeikov Central Geophysical Observatory and at Leningrad University. Measurements were made at Voeĭkovo (30°42′E, 59°57′N, 74 m) and at Elbrus (42°40′E, 43°42′N, 2130 m). The apparatus were the Dobson spectrophotometer and the S. F. Rodionov and A. L. Osherovich electrophotometer with light filters. Measurements were made of total content of atmospheric ozone and of daily variation of atmospheric ozone. A method is described for making ozone measurements more exact by taking into account attenuation through aerosols. This procedure is based upon measurement of intensity of direct solar (or lunar) radiation and on determination of the effective radius of aerosol particles and their effective number in a vertical column of atmosphere with unit cross section using the curve of Houghton. A new method for measuring the vertical distribution of atmospheric ozone on the basis of direct solar radiation without the assumptions associated with the method of zenith light is presented. It is based upon a complete system of equations in which the unknowns are the concentrations of ozone at different elevations. Instead of solving these equations geometrically but by solving the integral equation

$$t(\theta) = \int_{h_0}^{H} \frac{X_h dh}{\sqrt{1 - \left[\frac{R}{R+h} \cdot \frac{\eta_0}{\eta(h)}\right]^2 \cos_2 \theta}}$$

where X_h—ozone concentration at h height h km, h_0—elevation above sea level of point of observation, H—height of upper boundary of ozone R—radius of the earth, $N(h)$—coefficient of atmospheric refraction at height h km and O—solar elevation. The solution of this equation is:

$$n(\theta) = \frac{H - h_0}{3\tau} \left[A(0,h_0)x_h + 4A(\theta,h_i)x_{hi} + 2A(\theta,h_2)x_{h2} + \cdots + \right]$$

where n = a whole even number, $h_n = H$, $h_0 < h_i < H$ when $0 < i < n$ and

$$A(\theta,h) = \frac{1}{\sqrt{1 - \left[\frac{R}{R+h} \cdot \frac{\eta_0}{\eta(h)}\right]^2 \cos^2 \theta}}.$$

The values of A are presented in a table and computations of ozone concentrations made with this

method are shown on a graph. *Subject Headings:* **1. Vertical ozone distribution 2. Ozone measurementtechniques.**—*I.L.D.*

10F–95 551.510.534:551.590.24

Gushchin, G. P., **Soderzhanie ozona v atmosfere nad raĭonom Leningrada vo vremia solnechnogo zatmeniia 30/VI 1954 g.** [Ozone content in the atmosphere over the Leningrad region during the solar eclipse of June 30, 1954.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 72:33–38, **1957.** 2 figs., table, 6 refs., 4 eqs. **DLC**—The measurements were carried out with aid of a Dobson spectrophotometer installed on the upper platform of the actinometric pavilion of the Main Geophysical Observatory. The obtained results presented in a table and in fig. 1 show that no regular variation of the quantity of ozone in the atmosphere has been observed during the eclipse. The maximum variation of the ozone content did not exceed .04 cm. It can be only noted that before the largest phase of the eclipse there occurred a certain increase of ozone content in the atmosphere which was, however, fully compensated before the very end of the eclipse. The conclusion is that a partial solar eclipse does not lead to noticeable changes in the atmospheric ozone layer. *Subject Headings:* **1. Ozone variations during eclipse 2. Solar eclipse, June, 1954 3. Leningrad, U.S.S.R.**—*A.M.P.*

10F–96 551.510.534:551.521.18

Gushchin, G. P., **Ob effekte obrashcheniia.** [The Umkehr effect.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 72:39–45, **1957.** 3 figs., table, 12 refs., 5 eqs. **DLC**—This is a critical review of statements by C. L. Pekeris (*Norske Videnskaps-Akademi i Oslo. Math.-Natur. Klasse, Avhandlinger*, No. 8, **1933**) concerning the inaccuracy of the usual interpretation of the Umkehr effect in connection with vertical ozone distribution. It is shown that with vertical ozone distributions such as found during rocket flights over New Mexico on June 14, 1949 and also in other cases, an Umkehr effect exists, i.e., Pekeris is in error when stating that there can be no minimum on the Umkehr curve. It is also shown that the form of the Umkehr curve is modified due to the presence of aerosols in the atmosphere. Therefore when calculating vertical ozone distribution by means of the method of zenith light, the attenuation on account of aerosols must be taken into consideration. *Subject Heading:* **1. Umkehr effect.**—*Referationyĭ Zhurnal*, 4198, 1958.

10F–97 551.510.534(791)

Haurwitz, B.; London, J. and Valovcin, F., **Seasonal variation of the vertical ozone distribution at Flagstaff, Arizona.** N. Y. Univ. College of Engineering, Research Div., Department of Meteorology and Oceanography, Contract AF 19(604)-1738, Scientific Report, No. 2, June **1957.** 23 p. 6 figs., 4 tables, 12 refs. **DWB** (M055 N532sr)—The seasonal and vertical distribution of ozone to 45 km as determined at Flagstaff, Ariz., on 200 days in 1955 is analyzed and compared with data from other stations, especially in high latitudes (e.g., Tromsö, Norway) and for other periods (1930–1948). Maximum density is at 15 km in January and 30 km in Aug. 10×10^{-3} to 16×10^{-3} cm/km). Up to 22 km, the maximum is in winter or spring and the minimum, in August–Sept. At higher levels it is reversed; at high levels, the regime is photochemical; at low levels, dynamically induced. Charts show year to year vertical, latitudinal and seasonal variations of total ozone on data for 24 stations. It is lowest at the equator and increases poleward. *Subject Headings:* **1. Seasonal ozone variations 2. Ozone distribution 3. Flagstaff, Ariz.**—*M.R.*

10F–98 551.521.17:551.510.534

Hearn, A. G.; Walshaw, C. D. and Wormell, T. W., **The absorption coefficient of ozone at 3021 Å.** *Royal Meteorological Society, Quarterly Journal*, 83(357):364–366, July **1957.** fig., 4 refs. **DWB**—A new determination of the absolute value of the absorption coefficient of ozone at 3021 Å is described. The value obtained for the decimal absorption coefficient, measured at 20°C, is 3.310 ± 0.009 (cm STP)$^{-1}$. This figure is in excellent agreement with the value for this wave length obtained by Vigroux (1953) and may be used with confidence in meteorological applications. (*Same item as* 8.10–161, Oct. 1957, *MAB.*) *Subject Heading:* **1. Ozone absorption coefficient.**—*Authors' abstract.*

10F–99 551.510.534(521.22)

Horiuchi, Goji (*Met. Training School, J. M. A., Kashiwa*), **On the atmospheric ozone at Tateno.** *Geophysical Magazine*, Tokyo, 28(1):107–115, Aug. **1957.** 4 figs., 6 tables, 17 refs., 3 eqs. Japanese version in *Journal of Meteorological Research*, Tokyo, 9(10):752–753, Oct. **1957.** 4 tables, 7 refs., 3 eqs. **DWB, DLC**—Preliminary observation of atmospheric ozone content made with G. M. B. Dobson's spectrophotometer No. 52 from July 1955–Oct. 1956 indicates that total amount of ozone tends to increase about 5×10^{-3} cm greater in the afternoon (14–15 h); the increment varies with seasons. The result obtained at Tateno agrees, though slightly higher, with the value at 36°N from the latitudinal ozone content distribution table prepared by P. Götz (1951). Ozone content

is constant beyond the altitude of 40 km. The ozone-content dip (drop) around noon-time is not clear in the observation except two occasions of clear mid-summer day of mild wind. Stratospheric air temperature can possibly have substantial influence on ozone content. *Subject Headings:* **1. Ozone variations 2. Tateno, Japan.**

10F–100 551.510.41:546.214(234.3)

Israël, Hans, **Ozone measurements in the frame of the "Alps-Project."** Germany. Deutscher Wetterdienst (Meteorological Observatory, Aachen), Contract AF 61(514)-640, Technical Note No. 14, July 15, **1957.** 6 p. 4 tables, 3 refs. **DWB**—Supplementary measurements determining the atmospheric ozone content close to ground were carried out in the frame of the atmospheric electric synoptic investigations in the region of the Swiss Alps 1954–55 at some stations. The measurements were made according to the technique developed by A. EHMERT. The results of the observations are communicated in this paper—for the time being without further treatment. Reports of the climatological and synoptic comparison of the results with atmospheric electric and meteorological data will be given at a later date. *Subject Headings:* **1. Ozone near the ground 2. Swiss Alps.**—*Author's abstract.*

10F–101 551.510.534:551.508.952(521,22)

Japan. Meteorological Agency, Tokyo, **Aerological Observatory, 1957,** pub. **1957.** 8 p. 16 figs.—Brief outline of the Tateno Aerological Observatory's observation and research work, with illustrations of instruments and sample records. The Observatory's program includes climatic and aerological observations and measurements of total ozone (since May 1955), vertical distribution of ozone (with air-borne spectrograph) and nocturnal radiation. *Subject Headings:* **1. Tateno Aerological Observatory 2. Aerological measurements 3. Ozone measurements 4. Tateno, Japan.**—*G.T.*

10F–102 551.510.534:551.547

Kawamura, K. (*Met. Res. Inst., Japan*), **The atmospheric ozone in relation to upper meteorological conditions.** *Papers in Meteorology and Geophysics*, Tokyo, 7(4):393–399, Jan. **1957.** 4 figs., 9 refs. **DWB**—The relations between the amount of atmospheric ozone observed at Tokyo for the period from 1953 to 1955 and the upper meteorological conditions were studied. Day-to-day variations of the ozone amount are generally explained with the conception of upper pressure pattern, that is a high ozone amount near a trough and a low amount near a ridge. But, in addition to this the vertical motions of the upper atmospheric air accompanied by a jet stream may be considered as a secondary effect. Moreover, in the southernmost region of the trough at 300 mb level, ozone variations were essentially small. The result shows that in this region the intensity of the vertical motions of the air contributing to ozone variation is less than in the other regions of the trough. (*Same item as* 9.4–118, April 1958, *MAB.*) *Subject Headings:* **1. Ozone amount 2. Upper air pressure-ozone amount relationships 3. Tokyo, Japan.**—*Author's abstract.*

10F–103 551.508.952:551.510.534

Kulcke, Werner and Paetzold, Hans-Karl, **Über eine Radiosonde zur Bestimmung der vertikalen Ozonverteilung.** [A radiosonde for determining the vertical distribution of ozone.] *Annalen der Meteorologie*, 8(1/2):47–53, **1957.** 6 figs., 4 refs. **DWB**—An optical ozone sonde was constructed using wave lengths of 3250 Å (absorption 0.2/cm) and 3000 Å (4.8/cm). Properties of various filters are described. As a light receiver a Se-photocell with quartz window was selected. The light falling on the photocell is cut to a frequency of 50 per sec by a toothed wheel and magnified 1000 times by a simple 3-stage strengthener. Block diagrams of the set up and calibration scheme are given and specimen of vertical distribution shown. (*Same item as* 9.1–148, Jan. 1958, *MAB.*) *Subject Heading:* **1. Ozonesondes.**—*C.E.P.B.*

10F–104 551.510.534

†Kuznetsov, A. P., **Nabliudenie vertikal'nogo raspredeleniia ozona v atmosfere.** [Observation on the vertical ozone distribution in the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, 9:1154–1163, **1957.** 18 figs., 13 refs., 13 eqs. **DWB**—A brief review of the direct and indirect methods of measuring the ozone content of the atmosphere, in particular the methods of GÖTZ and DOBSON are summarized briefly. The construction of a very sensitive photoelectric spectrophotometer, for measuring the relative intensity of two wave lengths both of direct solar radiation and of light scattered from the zenith of a clear sky, is described with the aid of a photograph and a diagram. This instrument developed at Moscow University is a modification of the Dobson photoelectric spectrometer. The results of measurements made in Aug. and Sept. 1955 with this apparatus on the Lenin hills, 182m above sea level in the Moscow State University District are presented by means of graphs and are analyzed. In the numerical solution of the problem of the vertical distribution of atmospheric ozone, the data used were the coefficients of extinction of ozone and the coefficients of scattering

by air adopted by TÖNSBERG and OLSEN with the corresponding corrections taken from the tab of the coefficients of ozone extinction of Ni-Tzi-ze and Chung-Shi-piu and the values of atmospher density to 26 km from data of the Central Aerological Observatory of the Hydrometeorologic Service. No computations of vertical ozone distribution were made with the Götz-Dobson meth utilizing procedure A, which is set forth in this study. *Subject Headings:* **1. Vertical ozone distrib tion 2. Moscow, U.S.S.R.**—*I.L.D.*

10F–105 551.510.534:551.521

Mahmoudian, M. B., **Possibilité de détermination de la distribution verticale de l'ozone p effet Götz en utilisant les bandes de Chappuis.** [Possible determination of vertical ozone di tribution by means of the Götz effect, using the Chappuis bands.] *Journal Scientifique de la M téorologie*, Paris, 9(33):23–36, Jan./March **1957.** 10 figs., 7 tables, 7 refs. English and Spanis summaries p. 23. **DLC**—On the basis of various data concerning vertical distribution of ozone an the coefficients of various absorptions, it is shown that the Götz effect must be present also in th range of the Chappuis bands. That effect, nevertheless, is at its maximum when the sun is belo the horizon. By taking up a position outside the bands of absorption of water vapor it is possib to determine the vertical distribution of ozone by means of the visible spectrum. The wave leng pairs to be used are specified. *Subject Headings:* **1. Vertical ozone distribution 2. Umkehr effe 3. Ozone absorption coefficients.**—*Author's abstract.*

10F–106 551.510.534:0

†Martin, Clyde D., **High altitude weather affecting background radiation.** North America Aviation, Inc., Contract AF 33(600)-24347, (Unnumbered report), April 15, **1957.** 95 p. 5 figs 6 tables, over 500 refs. **DWB** (M10.53 M379h)—Section 3 of this monograph contains a full revie of the available knowledge and literature on the following aspects of ozone research: 1) Vertic distribution of ozone and 2) Variation of ozone amount with meteorological conditions. A figure an three tables give the more significant observations and measurements of ozone distribution and amoun and appended is an excellent bibliography of 52 references on the subjects covered. *Subject Heading* **1. Ozone 2. Ozone bibliographies.**—*R.P.*

10F–107 535.33:551.521.18:91

*Migeotte, M.; Neven, L.; Swensson, J. and Vigroux, E., **An atlas of nitrous oxide, methane an ozone infrared absorption bands, Pt. 1, The photometric records (of) Nitrous oxide and methan bands from 2.8 to 8.9 microns** (and) **Ozone bands from 3.2 to 10.2 microns.** Liège. Universit Institut d'Astrophysique (and) Belgium. Observatoire Royale de Belgique, Contract AF 61(514 432, Technical Final Report, Phase B, Pt. 1, **1957.** 68 p. 16 refs., 16 charts. 30 cm×56 cm. **Pt. Measures and identification . . .** *Ibid.*, Technical Final Report, Phase B, Pt. 2, **1958.** 40 13 tables, 14 refs. These reports issued as Special Volumes by the Institut d'Astrophysique l'Université de Liège, **1957** and **1958,** respectively.—The oversize atlas gives high resolution absor tion spectra of N_2O and CH_2 in the 2.87 to 8.56μ region and O_2 bands from 3.2 to 10.2μ obtained 1950 and 1951, at the Jungfraujoch Observatory at 3580 m (Switzerland). The plates are actu full size photographic reproductions of the original records on the same scale as that used in th photographic reproductions of the original records on the same scale as that used in the Photometr Atlas. Pt. II gives wave lengths and wave numbers for 5048 telluric and solar lines given in th Photometric Atlas of the solar spectrum from 2.8 to 23.7μ, and the identification for 90% of the lin (since there may be several contributors to a given line, the total of 5048 lines is greater than the 362 in the "Atlas"). The "Comments" section goes into greater detail on the identification of lines H_2O and CO_2 absorption, and fuller explanation of differences between Jungfraujoch spectra an those obtained in laboratory or solar spectra obtained at lower altitudes. *Subject Headings:* **1. Sola spectrum 2. Carbon dioxide absorption bands 3. Nitrous oxide spectrograms 4. Methan spectrograms 5. Ozone spectrograms 6. Infrared spectrum atlases.**—*M.R.*

10F–108 551.510.53

Miller, L. E. and Junge, C. E., **Atmospheric composition.** (In: **Handbook of geophysics f Air Force designers,** ed. by C. F. Campen, Jr. et al. 1st ed. Wash., D. C., **1957.** Ch. 8 (12 p 16 figs., 8 tables, 3 refs.) **DWB**—This chapter presents tables and graphs showing data on th abundance and vertical distribution of the gases and aerosols which exist in the atmosphere, an indicates certain properties of a few of the variants which should be considered. Rocket observatio have been used as a basis for much of the information on atmospheric gases for the region betwe 50 and 150 m. Beyond the latter altitude the best theoretical estimates have been used. Aeros measurements have been made at the surface, on mountain tops and from balloons. Of the variab gases, ozone and water vapor are discussed. Graphs showing seasonal and latitudinal variatio of ozone and variation of frost point and temperature with height are included. *Subject Heading* **1. Atmospheric composition 2. Seasonal ozone variations.**—*Authors' abstract and G.T.*

10F–109 551.508.952:551.510.534

New Mexico. Univ. Dept. of Physics, **Chemical telemetering sonde for balloon soundings of atmospheric ozone.** Contract AF 19(604)-1950, Scientific Report, No. 1, Dec. 26, **1957.** 29 p. 13 figs., table, 3 refs. (ASTIA-152-517 Div. 2) (Original unchecked)—A telemetering chemical balloon ozone sonde was developed and tested for routine soundings of the density of atmospheric ozone to heights of about 90,000 ft. The sonde consists essentially of an air pump, a reaction chamber, a sensing cell with amplifier, and a solution-cycling mechanism. The cycling mechanism also serves to key the radiosonde in a manner which allows the exact determination on the radiosonde record chart of the time at which the end point of the chemical reaction is reached. The air pump consists of a small centrifugal blower whose air flow as a function of pressure is calibrated on the ground under flight conditions. The electrolytic sensing cell, comprised of Pt electrodes and solution, passes a current when the end point of the reaction is reached. A dc amplifier is connected to the sensing cell in such a way that a cell current of 5×10^{-9} ampere closes a relay in the output of the amplifier. This relay causes a cycling motor to drain a portion of the solution in the reaction chamber and then to inject into the chamber an accurately metered amount of KI solution containing a known quantity of $Na_2S_2O_3$. Whenever the cycling motor performs this cycling operation, a brief signal is transmitted by the radiosonde to the ground. The ozone measurement consists of measuring on the regular recorder chart the time intervals which elapse between cycling operations. The balloon flight on December 21, 1957 had a total of 23 such cycles, giving 22 ozone values in 100 min over an elevation interval of 25 km. (See also AD-45 088). *Subject Heading:* **1. Ozonesondes.**—*ASTIA abstract.*

10F–110 551.515:551.510.534(52)

Okabayashi, T. and Yamasaki, M. (*both, Aerological Obs.*), **On the total amount of ozone over Tateno and its relation to meteorological conditions in the lower stratosphere.** *Tateno, Japan. Aerological Observatory, Journal,* 6(1):37–44, Jan. **1957.** 4 figs., 8 refs. In Japanese; English summary p. 37. **DLC**—The results of the analysis on the variations of the total amount of atmospheric ozone measured with the Dobson spectrophotometer No. 52 at Tateno from July 1955 to June 1956, and the investigation of its relations to the meteorological conditions of the lower stratosphere are presented. The results are abridged as follows: 1) In the annual variation of the total amount of ozone during the course of this period, a smaller amount is found in autumn and a larger in spring as in other countries. The minimum occurs in the first decade of Oct. and the maximum in the first decade of March. The amplitudes of the day-to-day variation are small in autumn and large in spring; 2) In the day-to-day and seasonal variations the positive correlation between the total amount of ozone and the temperatures of the standard pressure levels (correspond to potential temperature) in the lower stratosphere is found; 3) With regard to the day-to-day variation it is shown that ozone amount varies almost inversely with the height of the standard pressure level or trough and ridge in the lower stratosphere; 4) In the day-to-day variation it is shown that the larger total amount of ozone generally appears after the appearance of the maximum S-component of the wind velocity averaged for 300, 250 and 200 mb levels, and the smaller amount after the minimum S-component or the maximum N-component. At this stage, however, no distinct connections are obtained with regard to E-W component; 5) The relation mentioned in (3) is most distinguished at about 250 mb level (about 10,000 m in alt.) and it seems to become uncertain at higher or lower levels gradually. (*Same item as* 9.7–154, July 1958, *MAB.*) *Subject Headings:* **1. Ozone variations 2. Weather effects on ozone amount 3. Tateno, Japan.**—*Authors' abstract.*

10F–111 551.510.534:551.506.22

Paetzold, Hans-Karl, **Das Internationale Geophysikalische Jahr, IX, Das atmosphärische Ozon.** [The IGY, Pt. 9, Atmospheric ozone.] *Umschau,* 57(17):532–534, Sept. 1, **1957.** 7 figs., 2 refs. **DLC**—Ozone distribution at Tromsö (70°N) in spring and fall and at the equator, and seasonal distribution in S. Germany, are shown up to 40 km. Only above 30 km is the annual variation due to varying solar height; below this it is due to transport processes. The meridional circulations in summer and winter hemispheres, and different types of vertical ozone distribution over Weissenau, are shown. The permanent maximum is at 23 km, secondary maxima at 16 and 5 km. Methods of measurement and the vertical circulation over high and low pressures are briefly described. Variations of total ozone at Weissenau are related to the incidence of subtropical and polar air masses. The world-wide ozone program of the IGY is briefly sketched. (*Same item as* 8.11–156, Nov. 1957, *MAB.*) *Subject Headings:* **1. Ozone layer 2. IGY ozone networks.**—*C.E.P.B.*

10F–112 551.510.41:546.214

†Paetzold, H. K. and Regener, E., **Ozon in der Erdatmosphäre.** [Ozone in the earth's atmosphere.] *Handbuch der Physik,* Berlin, 48:370–426, **1957.** 47 figs., numerous foot refs., bibliog. p. 424–426 (46 refs.), 10 tables, 25 eqs. **DWB** (551.03 N236)—A long review of the history and present status of ozone research from its discovery in 1785 (by Van Marum) to the latest work of

the authors in 1957. The six main chapters cover: 1) general and historical; 2) the absorptio spectrum of O_3; 3) methods of measurement (a. optical, b. chemical); 4) photochemical theory 5) vertical variation; 6) variations of total ozone; 7) the ozone layer and structure of the stratospher Every conceivable aspect is considered and supported by tables and charts. Examples are given records, geographical and synoptic relationships, seasonal, diurnal and height variations, etc. (*Sam item as* 9.3–12, March 1958, *MAB.*) *Subject Headings:* **1. Ozone 2. Ozone bibliographies 3. Ozon data 4. Ozone records.**—*M.R.*

10F–113 551.558.29:551.510.53

Paetzold, Hans-Karl, **Zur Analyse von atmosphärischen Transportvorgängen durch Variatione des Ozons.** [On the analysis of atmospheric transport processes by variations of ozone.] *Annal der Meteorologie*, 8(1/2):40–46, **1957.** 9 figs., table, 7 refs. **DWB**—On May 30, 1956 a balloo carrying a UV spectrograph reached 44 km at Weissenau. The first transport process is a downwa current of 10^{11} O_3 mol/cm²/sec by turbulent vertical exchange 20 km-ground. There are maxima 23 km (photochemical), 15 and 6 km (horizontal advection) depending on season but very variab due to vertical movements. (*Same item as* 9.1–235, Jan. 1958, *MAB.*) *Subject Headings:* **1. Vertic ozone distribution 2. Ozone transport 3. Weissenau, Germany.**—*C.E.P.B.*

10F–114 551.510.41:546.2

Paetzold, Hans-Karl and Zschörner, Helmut, **Typische Schwankungen des totalen Ozonbetrag in Weissenau.** [Typical variations of the total amount of ozone at Weissenau.] *Annalen d Meteorologie*, 8(1/2):54–58, **1957.** 7 figs., ref. **DWB**—Intensity variations take account of ha and Rayleigh extinction, the first being variable. Total ozone content in spring increases some da before incursion of cold air on ground. The lower maxima (15 and <10 km) are characteristi Warm air of 28/29.2.1956 coincided with a rapid decrease of ozone below 10 km. On 31.3.19 ozone decreased in rear and increased in front of a high. A föhn outbreak of 21.3.1956 was preced by several hours by an increase of ozone by 9%. Finally, simultaneous observations by dire sunlight and zenith light on 16.3.1956 showed a time difference of 2 hrs in phase. (*Same item* 9.1–161, Jan. 1958, *MAB.*) *Subject Headings:* **1. Ozone variations 2. Weissenau, German** —*C.E.P.B.*

10F–115 551.510.534:551.521.

Ramanathan, K. R. and Dave, J. V. (*both, Physical Res. Lab., Ahmedabad*), **The calculati of the vertical distribution of ozone by the Götz Umkehr-effect (method B).** *International Ge physical Year*, 1957/1958, *Annals*, Vol. 5, (IGY Instruction Manual), Pt. 1, Ozone, pub. Londo Pergamon Press, **1957.** p. 23–45. 3 figs., tables, 24 refs., eqs. **DWB** (M06.22 161ann)—Anoth method of calculating the vertical distribution of ozone by the Götz Umkehr effect is offered. gives information on the changes in the vertical distribution of ozone associated with day-to-da changes in weather. It is easy to use in clear weather at all stations equipped with a Dobson spectr photometer. Measurements required here are the ratios of the intensities of light of two wav lengths from the clear zenith sky for zenith distances of the sun varying from 40° to 60° to 9 *Subject Headings:* **1. Vertical ozone distribution calculation 2. Umkehr effect.**—*N.N.*

10F–116 551.508.952:551.510.5

Regener, Victor H., **Chemical telemetering sonde for balloon sounding of atmospheric ozon** New Mexico. Univ. Dept. of Physics, Contract Cwb-8810, Research Report (unnumbere Dec. 26, **1957.** 29 p. 13 figs., table, 3 refs., eqs. **DWB** (M08.952 N532ch)—The principle ozone measurement by the I. G. Bowen, V. H. Regener (1951) system, the details of the 8.8 instrument constructed under U. S. W. B. and U. S. A. F. contract (preparations of solution, pump and calibration of the air flow, reaction chamber, metering and cycling device, amplifi keying of the U. S. W. B. radiosonde, evaluation of radiosonde record in terms of ozone densit details of successful balloon flight to 27 km on Dec. 21, 1957 (using 4 balloons), preliminary operati instructions, general physical data of the ozonesonde and recommendations are included in t report. Appended are diagrams showing detailed construction, wiring, calibration, records a results obtained on the successful flight. (*Same item as* 10.3–153, March 1959, *MAB.*) *Subj Headings:* **1. Ozonesondes 2. Ozonesonde data 3. Chemical telemetering ozonesondes 4. Alb querque, N. Mex.**—*M.R.*

10F–117 551.510.534(78

Regener, V. H., **Ozone concentration profiles—University of New Mexico.** (In: Lettau, H. and Davidson, Ben. (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, 19 Vol. 1:188–198. 6 figs., table, 10 refs.) **DWB**—The diurnal variation of the concentration of ozo near the earth's surface, the tendency of ozone to disappear at the earth's surface owing to its chemi activity, the influence of turbulence on ozone flux, etc. are discussed. The measurement of t

ertical ozone profile with automatic chemical recorders as carried out at O'Neill, is described. The quipment for the automatic chemical determination of atmospheric ozone and the arrangement of ntake tube for ozone profile studies are described with the aid of diagrams. Graphs showing ozone ecordings at four levels above the ground during several periods during Aug. 1953 are reproduced. hese diurnal fluctuations are attributed to changes in ozone transport at higher altitudes. The etermination of the ozone flux is based upon the assumption that the eddy diffusivity for ozone is he same as that for momentum. The ozone flux into a grass surface such as that at O'Neill may be presented approximately by the relation $Q = 0.03\ q.10''$ molecules/cm²sec where q is the ozone ensity expressed in g/m³ at a level of about 40 cm above the surface. *Subject Headings:* **1. Vertical zone profile 2. Diurnal ozone variations 3. Ozone near the ground 4. O'Neill, Nebr.**—*I.L.D.*

10F–118 551.510.534

Regener, Victor H. (*Dept. of Physics, Univ. of New Mexico, Albuquerque*), **The vertical flux of tmospheric ozone.** *Journal of Geophysical Research*, Wash., D. C., 62(2):221–228, June **1957.** figs., table, 10 refs. **DLC**—The downward flux of atmospheric ozone near the earth's surface is valuated from recordings in Nebraska of the vertical profile of ozone and from simultaneous data n the wind profile and on the shearing stress at the surface. Furthermore, recordings of the ozone oncentration in New Mexico at two levels which are 4000 ft apart in altitude are used, together ith the previously determined flux value, for an estimate of the coefficient of exchange in the tmosphere between the two stations. The observed differences in the ozone concentration at the wo stations are also examined in relation to wind and temperature. (*Same item as* 8.10–130, Oct. 957, *MAB.*) *Subject Headings:* **1. Vertical ozone distribution 2. Ozone concentration 3. Ne- raska 4. New Mexico.**—*Author's abstract.*

10F–119 551.510.534

Romick, Gerald and Murcray, Wallace, **Atmospheric ozone at College, Alaska.** Alaska. Univ. eophysical Institute, Contract AF 19(604)-1817, Final Report, April **1957.** 46 p. 18 figs., (incl. hotos), 2 tables, 13 foot-refs., 13 eqs. **DWB**—Data from a previous contract were analyzed to btain the vertical distribution of ozone from the Umkehr theory. The method employed is ex- ensively described. The analysis of the data shows a highly fluctuating distribution with the ossibility of a larger percentage of the total amount of ozone in the higher layers of the atmosphere han is normally shown in data published from other stations. Infrared techniques for monitoring he ozone in the 9.6 micron band of the spectrum of the atmosphere are given. These techniques re more favorable for the winter months than are the ultraviolet measurements using the Dobson pectrophotometer. Preliminary experimental results suggest a possible correlation between the urora and ozone. *Subject Headings:* **1. Vertical ozone distribution 2. Umkehr theory 3. College, laska.**—*Authors' abstract.*

10F–120 551.510.534

Schöttner, Károly, **Az ózon szerepe légkörünkben.** [The role of ozone in the earth's atmos- here.] *Időjárás*, Budapest, 61(3):212–215, May/June **1957. DLC**—Meteorological problems onnected with the presence of ozone in the atmosphere (UV absorption, temperature in the ozono- here, stratospheric radiation balance, ozone concentration as an indicator of air movement, etc.) re discussed in general terms. *Subject Heading:* **1. Ozone.**—*G.T.*

10F–121 551.510.41:546.214:546.17

Tanaevsky, Olga and Vassy, A., **Sur le dosage chimique de l'ozone atmosphérique.** [Chemical easurement of atmospheric ozone.] *Académie des Sciences, Paris, Comptes Rendus*, 244(7):924– 25, Feb. 11, **1957.** 5 refs. **DLC**—Comparative experiments show that the presence of nitrogen eroxide in the air is not a source of error in the chemical measurement of ozone. (*Same item as* 10–156, Oct. 1958, *MAB.*) *Subject Headings:* **1. Ozone measurements 2. Nitrogen peroxide in tmosphere.**—*Transl. of authors' abstract.*

10F–122 551.510.41:546.214:551.508.952:535.243

Tateno, Japan. Aerological Observatory, **Observations of the total amount of ozone over ateno.** *Tateno, Japan. Aerological Observatory, Journal*, 6(1):17–35, Jan. **1957.** 8 figs., 5 tables, eqs. In Japanese; English summary p. 17. **DLC**—The Dobson spectrophotometer No. 52 as installed in the Aerological Observatory at Tateno in the spring of the year 1955 for measuring e ozone in the atmosphere. In the first half of this article, a short explanation of the instrument, rinciples of the observation of the total amount of ozone, constants of the instrument and sources errors are described. In the second half, results obtained from the calibration of the wedges, e test of wave length with mercury lamp, the test of instrumental constants with standard lamps d "long method" observations are reported, and also the fact that fluctuations of dial readings the standard lamp test are mainly due to the dependence of the transmission of the lamp bulb

on its temperature, is discussed. Finally, the daily mean values of the total amount of ozone ob tained from the direct sun observations on clear days during the period from June 1955 to Nov 1956, are tabulated. (*Same item as* 9.7–143, July 1958, *MAB.*) *Subject Headings:* **1. Ozone meter 2. Dobson spectrophotometer 3. Tateno, Japan.**—*Author's abstract.*

10F–123 551.510.534:551.521.1

Taylor, J. H. and Yates, H. W. (*both Naval Res. Lab., Wash., D. C.*), **Infrared evidence fo atmospheric ozone at sea level.** *Optical Society of America, Journal,* 46(11):998, Nov. **1956.** fig 5 refs. Also their **Atmospheric transmission in the infrared.** *Ibid.,* 47(3):223–226, March **1957** 8 figs., 2 tables, refs. Also: Birkeland, J. W.; Burch, D. E. and Shaw, J. H. (*all Ohio State Univ.*, **Some comments on two articles by Taylor and Yates.** *Ibid.,* 47(5):441, May **1957. DLC**—Infrare atmospheric transmission from 0.5 to 15 is shown as measured over three horizontal paths of 1000 f 3.4 statute mi, and 10.1 statute mi (Chesapeake Bay Annex, NRL). The intense source, a 60 in carbon arc searchlight, permits a resolution throughout of about 10 wave numbers. In the firs paper a spectrum obtained over the 10.1 mi path on May 24, 1956, at 12:40 p.m., is presente which shows ozone absorption corresponding to an ozone concentration of 2.6 parts per 100 millio in agreement with the sea-level values reported by Baum and Denkelman (1955). In the secon paper atmospheric transmission spectra (including ozone absorption) are presented, representing a average clear winter day, a moderately dense fog and a snowstorm. *Subject Headings:* **1. Surfac ozone determination 2. Infrared radiation transmission.**—*Authors' abstract and G.T.*

10F–124 551.510.4

Tow, Philip S. (*Air Pollution Control District, County of Los Angeles*), **Considerations of th feasibility of control of oxides of nitrogen.** *Air Pollution Control Association, Journal,* 7(3):234–240 Nov. **1957.** fig., table, 28 refs., eqs. **DWB, DLC**—The ozone formation in the Los Angeles at mosphere is dependent on the nitrogen dioxide and hydrocarbon concentrations. Recent investig tions on the means of controlling the oxides of nitrogen over Los Angeles indicate that there is a yet no ready solution for this problem, but that it is feasible. No evidence can yet be offered tha the limiting factors in ozone formation are the organic materials or oxides. More evidence o necessity of control of nitrogen must be presented before control systems can be legally require On the other hand, research on control methods up to final development stages should be carried ou The material includes some possible methods of control. *Subject Headings:* **1. Atmospheric pollutio control studies 2. Nitrogen oxides in atmosphere 3. Ozone formation 4. Los Angeles Basi** —*N.N.*

10F–125 546.214:551.594.22:551.510.4

Vassy, Arlette T. (*Physique de l'Atmosphère, Univ. de Paris*), **The formation of ozone b electrical discharges in the atmosphere: experimental results and the general aspects.** (In: **Th threshold of space,** ed. by M. Zelikoff. N. Y., Pergamon Press, **1957.** p. 73–77. 8 refs.) **DLC**— Continuous measurements of the concentration of atmospheric ozone near the ground and of th electrical discharges in thunderstorms have been made at the Station Scientifique du Val-Joyeu (lat. 48°49′N, long. 2°1′E). A study of the results reveals that two periods are clearly distinguis able. During summer months the correlation between the sharp rises in the quantity of ozone an the appearance of thunderstorm is very marked. But in winter, on the other hand, the ozone amoun near the ground does not depend on the occurrence of thunderstorms but may increase when th atmospheric conditions are relatively stable. It appears that the formation of ozone by the thunde storms is rather due to the electrical discharges present in the atmosphere before and during th formation of thunderclouds than because of the lightning. A study of this problem in the laborato has revealed that the lightning produces more nitrogen oxides than ozone. (*Same item as* 9.9–30 *MAB.*) *Subject Heading:* **1. Ozone-thunderstorm relationships.**—*Author's abstract.*

10F–126 551.510.534:523.

Vigroux, Ernest, **Spectrophotométrie de l'éclipse de lune du 29–30 janvier 1953.** [Spectr photometric measurement of the lunar eclipse of Jan. 29–30, 1953.] *Annales d'Astrophysiqu* Paris, 17(5):399–415, Sept./Oct. **1954.** 8 figs., 5 tables, 10 refs., eqs. Also his: **Compléments à d résultats antérieurs relatifs à l'éclipse de lune du 29–30 janvier 1953.** [Supplement to previo results relating to the lunar eclipse of Jan. 29–30, 1953.] *Ibid.,* 13(1):69–82, Jan./Feb. **1957.** 9 fig 3 tables, 7 refs., 7 eqs. **DLC**—The study reported in the first paper comprises the spectral ran 4,500 to 6500 Å. Ozone absorption plays an essential part in the spectral distribution which w calculated from the reduced thicknesses measured along a vertical line near the equator. A mark secondary maximum is identified in this region. A few measurements made under favorable cond tions make it possible to calculate, although with less accuracy, the distribution at higher latitude Certain selective absorptions, unconnected with ozone or diffusion, are clearly identified; two these appear to be due to molecular oxygen. In the second paper the author reports addition

xperiments which prove that penumbral light does not affect measurements made at various points f the lunar shadow. The validity of information on ozone contained in the first paper is confirmed. *Subject Headings:* **1. Vertical ozone distribution 2. Lunar eclipses.**—*Author's abstract and G.T.*

10F–127 551.510.534:551.521.18:551.508.25

Walshaw, C. D., **Integrated absorption by the 9.6μ band of ozone.** *Royal Meteorological Society, Quarterly Journal*, 83(357):315–321, July **1957.** 2 figs., 3 tables, 16 refs., eq. **DWB**—Measurements of band absorption of ozone amounts from 0 to 1.5 cm STP at pressures of 10 to 760 nm Hg are tabulated and apparatus described. An empirical equation is fitted. The best fit is given by slightly modified values of the absorption coefficients determined by E. VIGROUX, which have a standard error of 2.4%, but the international network using Dobson spectrophotometers employs the coefficients of NY and CHOONG, which differ considerably. (*Same item as* 8.10–131, Oct. 1957, *MAB.*) *Subject Heading:* **1. Ozone absorption.**—*C.E.P.B.*

10F–128 551.510.534:551.521.31

Walton, G. F. (*Carnegie Lab. of Physics, Queens College, Dundee*), **The calculation of the vertical distribution of ozone by the Götz Umkehr-effect (method A).** *International Geophysical Year, 1957/1958, Annals*, Vol. 5, (IGY Instruction Manual), Pt. 1, Ozone, pub. London, Pergamon Press, **1957.** p. 9–22, 3 figs., tables, eqs. **DWB** (M06.22 161ann)—A method of calculating ozone distribution is outlined. The amount of ozone found in the first 12 km of the atmosphere above the ground is 8.5% of the total ozone amount. This is distributed uniformly with height. The ozone density decreases exponentially with height above 36 km. This is a general feature of the vertical distributions as determined from rocket data. Details on the mathematics are outlined for this particular method, method A. *Subject Headings:* **1. Vertical ozone distribution calculation 2. Umkehr effect.**—*N.N.*

10F–129 551.501:551.510.534

Walton, G. F., **Ozone information from sky observations.** *Royal Meteorological Society, Quarterly Journal*, 83(357):366–368, July **1957.** 2 refs., 9 eqs. **DWB**—The information of the vertical distribution of atmospheric ozone obtainable from measurements of scattered sunlight received from various directions in the sky is considered. It is shown that observations in a particular direction in the sky could replace, but would not supplement the customary zenith sky observations, except in high latitudes at certain seasons of the year. Observations in various directions in the sky would be equivalent to zenith sky observations made throughout the day. (*Same item as* 8.10–85, Oct. 1957, *MAB.*) *Subject Heading:* **1. Ozone measurement techniques.**—*Author's abstract.*

10F–130 551.510.534:551.521.17

Walton, G. F., **The relation between an Umkehr curve and the vertical distribution of atmospheric ozone.** *Royal Meteorological Society, Quarterly Journal*, 83(356):173–180, April **1957.** 2 figs., tables, 13 refs., 22 eqs. **DWB**—An expression is derived for the intensity-ratio for two wavelengths in the ultraviolet of primary scattered sunlight received from the zenith at the base of a plane-stratified atmosphere. The logarithm of the intensity-ratio is expanded in a series which reveals the nature of the relation between it and the vertical distribution of atmospheric ozone. The information on the vertical distribution given by zenith observations when the sun is high in the sky is discussed. (*Same item as* 8.8–187, August 1957, *MAB.*) *Subject Headings:* **1. Vertical ozone distribution 2. Ultraviolet radiation.**—*Author's abstract.*

1958

10F–131 551.510.534

*Adel, Arthur (*Atmos. Res. Obs.*), **VODARO parameters, 1953.1957.** Arizona. State College, Flagstaff, Contract AF 19(604)-2177, Scientific Report HB-5, April 9, **1958.** 80 p. almost entirely tables, 3 refs.—Consisting entirely of tabular data, a record of the infrared parameters for the period July 1953–June 1957, and the ultraviolet parameters for the period Aug. 1954–June 1957 is presented. Parameters required for the calculation of vertical ozone distributions by the method of VODARO are listed. The parameters are ERTOR (the effective radiation temperature of the ozone region), the pressure weighted absorption of infrared solar radiation by ozone, and ozone's essentially pressure independent absorption of ultraviolet solar radiation. Precipitable water measurements are used correctively. *Subject Headings:* **1. Vertical ozone distribution calculation 2. VODARO parameters.**—*R.P. and G.T.*

10F–132 551.510.42

Altshuller, Aubrey P. (*Community Air Poll. Program, U. S. Public Health Service*), **Natural sources of gaseous pollutants in the atmosphere.** *Tellus*, Stockholm, 10(4):479–492, Nov. **1958.**

bibliog. p. 489–492. **DLC**—Various gaseous pollutants including ozone, nitrous oxide, nitric oxide, nitrogen dioxide, methane, hydrogen, formaldehyde, ammonia, hydrogen sulfide, mercaptans, chlorine compounds and free radicals can be formed by natural processes such as ultraviolet photo chemical processes in the upper atmosphere and microbiological processes. The modes of formation and destruction of these gases, especially of their concentrations in the atmosphere, and the various reactions in which these gases can participate with each other are discussed in detail. *Subject Headings:* **1. Atmospheric pollution 2. Gaseous pollutants.**—*Author's abstract.*

10F–133 551.521.2:551.510.53:546.26

†Brooks, Douglas L. (*Operations Evaluation Group, M.I.T.*), **The distribution of carbon dioxide cooling in the lower stratosphere.** *Journal of Meteorology*, Boston, 15(2):210–219, April 1958. 14 figs., 4 tables, 16 refs., 6 eqs. **DWB, DLC**—The distribution of radiational cooling due to carbon dioxide is computed for the stratosphere below 30 km in an effort to provide an insight into the role of radiation in the observed seasonal and latitudinal changes of temperature and flow. Laboratory results of BURCH, HOWARD, and WILLIAMS for the absorption of the 15μ band are used as an empirical basis for the computations. When the results are combined with data on solar absorption of ozone provided by PRESSMAN, and other radiational factors are assumed negligible, carbon dioxide is found to determine the radiational rates of temperature change below about 40 to 60 mb. In addition, it determines the rates at all heights north of the boundary of polar night. Ozone heating dominates the pattern above 40 to 60 mb south of the polar night boundary. Cooling maxima are 1 to 1.2 K per day near the 60 mb level in spring and summer and the 30 mb level in fall and winter. Heating increases above this level and exceeds 3 to 4 K per day at the highest altitudes considered. In spite of this large solar heating of the ozone layer, the Arctic stratosphere below 30 km is in all seasons a region of net radiational deficit. However, ozone heating in the infrared is probably sufficient to create an excess in southerly latitudes for this layer. The entire stratosphere to 55 km is a region of net deficit in all seasons except summer as far south as 45° at least. Even in summer a deficit exists near the pole. In general, the circulation must supply heat to the Arctic stratosphere in all seasons, as well as maintain a temperature distribution showing large north-south gradients in the face of radiational effects tending to destroy these gradients. In fall and winter the temperature change gradients are such as to favor maximum local temperature gradients at the boundary of the polar night above the 20 mb level, a possible source for perturbations observed in this region. (*Same item as* 10.4–212, April 1959, *MAB.*) *Subject Headings:* **1. Radiational cooling 2. Carbon dioxide in stratosphere 3. Ozone absorption 4. Radiational temperature change.**—*Author's abstract.*

10F–134 551.510.534:551.521.1

Craig, Richard A. and Ohring, George (*both, GRD, AF Camb. Res. Center, Mass.*), **The temperature dependence of ozone radiational heating rates in the vicinity of the mesopeak.** *Journal of Meteorology*, 15(1):59–62, **1958.** 9 figs., table, 5 refs., 5 eqs. **DWB, DLC**—Radiational heating of the mesosphere results principally from absorption of ultraviolet radiation by ozone. For conditions of photochemical equilibrium, the amount of ozone present near the mesopeak depends critically on the temperature. Relatively high temperature results in less ozone and less heating. Calculations presented herein show that this effect has a strong stabilizing influence on the temperature value near the mesopeak. (*Same item as* 10.4–152, April 1959, *MAB.*) *Subject Headings:* **1. Ultraviolet absorption by ozone 2. Temperature-ozone amount relationships 3. Ozone radiational heating 4. Mesosphere.**—*Authors' abstract.*

10F–135 551.510.41:546.21

Ehmert, A., **Messung kleiner Konzentrationen in der Atmosphäre.** [Measurement of small concentrations in the atmosphere.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 30(2/3):123–126, **1958.** 13 refs. English and French summaries p. 123. **DWB, DLC**—A brief survey is presented of the distribution of atmospheric ozone and its connection with problems of turbulent mass exchange. Further, the methods of measuring small concentrations are discussed. It is pointed out that these methods are suitable for the study of locally escaping gases. (*Same item as* 9.9–150, Sept. 1958, *MAB.*) *Subject Heading:* **1. Ozone concentration.**—*Author's abstract.*

10F–136 551.510.41:551.510.52:546.21

Goody, R. M. and Roach, W. T. (*both, Imperial College, London*), **The determination of tropospheric ozone from infrared emission spectra.** *Royal Meteorological Society, Quarterly Journal*, 84(360):108–117, April **1958.** fig., 5 tables, 17 refs. **DWB, DLC**—The emission spectrum of the sky has been measured on 127 occasions at Ascot in a period of 12 months in 1956 and 1957, and the observations have been interpreted in terms of the total amount of ozone between 1000 and 300 mb. The ozone amount in this layer varies about a mean value of 13×10^{-3} cm STP and an individual determination is accurate to about $\pm3\times10^{-3}$ cm STP. The results suggest that fluctuations in the

total ozone amount are controlled by different mechanisms in spring and the rest of the year, and that during this period advection may be the dominating effect. There is evidence that some of the tropospheric ozone has come from the upper stratosphere, but it also seems probable that much has been advected into these latitudes. Our results show very little relation to ground-level chemical measurements made just after mid-day. This disagreement might possibly be due to secondary sources of ozone near ground-level. *Subject Headings:* **1. Tropospheric ozone 2. Ozone amount 3. Ascot, Eng.**—*Authors' abstract.*

10F–137 551.510.42:551.508.95

Haagen-Smit, A. J. (*Calif. Inst. Tech. Pasadena, Calif.*) and Brunelle, Margaret F. (*Air Pollut. Control Dist., Los Angeles, Calif.*), **The application of phenolphthalein reagent to atmospheric oxidant analysis.** *International Journal of Air Pollution*, N. Y., 1(1/2):51–59, Oct. **1958.** 8 figs., table, 9 refs. **DWB, DLC**—In recent years, a form of air pollution has developed which is characterized by a strong oxidizing effect. For the measurement of this effect a colorimetric method has been developed, based on the oxidation of phenolphthalin to phenolphthalein. Good correlation has been reported between oxidant determined by this method and subjective observation, and a comparison is made of data obtained by different methods. A simple, semi-automatic sampler is described, and the results of 5 yrs of continuous sampling are presented. *Subject Headings:* **1. Air sampling and analysis 2. Oxidation meters 3. Ozone measurement techniques.**—*Authors' abstract.*

10F–138 551.510.534

Horiuchi, Goji (*Met. Training School J. M. A. Kashiwa*) and Shimizu, M. (*Torishima Weather Station*), **A note on the vertical distribution of atmospheric ozone at Tateno.** *Geophysical Magazine*, Tokyo, 28(4):431–437, Sept. **1958.** fig., 4 tables, 15 refs., 4 eqs. Also in: *Journal of Meteorological Research*, Tokyo, 10(3):240–242, March **1958.** fig., 4 tables, 12 refs. In Japanese. **DWB, DLC**—At present it has been generally accepted that atmospheric ozone is an important constituent from the meteorological viewpoint, even though its amount is extremely small, and especially the vertical distribution is of much interest in reference to the dynamic behavior of the upper atmosphere. However, direct observation of the vertical distribution of atmospheric ozone with balloon-borne or rocket-borne instruments (Regener, **1934; 1938.** Johnson et al., **1952; 1954**) is still scanty because of its difficulty or great expense. On the other hand, an indirect method to determine the height distribution by observing zenith scattered light, the so-called Götz Umkehr method (Götz, **1931.** Götz, Meetham and Dobson, **1934.** Chapman, **1935**), has proved highly effective by several authors (Johnson et al., **1954**; Ramanathan, **1954**). Thus, the International Ozone Commission of the IUGG recommended the method for routine use to all world-wide ozone observing organization during the IGY 1957/58. The present paper gives a preliminary note on the height distribution of atmospheric ozone at Tateno by means of the Umkehr method in continuation of the previous report on total ozone amount by one of the present authors (Horiuchi, **1957,** *see* 10F–99). It should be noted that the assumptions and parameters used here were not all based on the recommendation of the International Ozone Commission (1956, 1957) because its receipt was delayed. *Subject Headings:* **1. Vertical ozone distribution 2. Ozone data 3. Tateno, Japan.**—*Authors' introduction.*

10F–139 551.510.534(52)

*Japan. Meteorological Agency, **Aerological data of Japan. Dec. 1957.** Tokyo, **1958.** 276 p. 4 refs. Entirely tables. Appendix (4 p.), **Atmospheric ozone data. DWB**—Total amount of ozone as measured several times a day are tabulated for Tateno and Torishima. Also Umkehr observations on clear zenith sky for Tateno. (Ozone observations are also being made at Sapporo, Kagoshima and Marcus Island.) *Subject Headings:* **1. Ozone data 2. Japan.**—*G.T.*

10F–140 551.510.534:551.515(481)

Johansen, Harald, **On the relation between meteorological conditions and total amount of ozone over Tromsö.** (In: Polar Atmosphere Symposium, Oslo, July 2–8, 1956, **Proceedings, Meteorology Section.** N. Y., Pergamon Press. **DWB.** Also in: *Journal of Atmospheric and Terrestrial Physics*, London, Special Supplement, Pt. 1, 1957, pub. **1958.** p. 187–194. 3 figs., 5 tables.) **DLC**—The variation in the total amount of ozone over Tromsö and associated changes in meteorological elements, such as height of tropopause, upper-air temperature and pressure, have been studied. The correlation coefficients between the total amount of ozone and the elements just mentioned show an annual variation with only small coefficients during midwinter, and highest correlation coefficients during April–May. Correlation coefficients of total ozone with temperature and pressure at the levels of 3, 6, 9, 12 and 15 km show that the highest coefficients are found at 6 km. Correlation coefficients between ozone and potential temperature in the stratosphere during summer show that the highest correlations are found at 12–14 km, decreasing upwards to the level of 18 km. A comparison between the annual variations of the correlation coefficients and the annual variations of the

horizontal ozone gradient between 60 and 70 N shows that it is impossible to attribute the ozon variations solely to horizontal advection. By grouping the observations according to rise and fa regions of atmospheric pressure at ground level, it is shown that the variations of total ozone ar related to the fall and rise regions at ground level, to the height of the tropopause and to the uppe pressure variations, pointing to dynamical processes being of great importance to the connectio between ozone and weather. The variation of 5-day means of ozone in relation to the 5-day mean of pressure and temperature at 6 km has been studied. It was found that the ozone content varie inversely to the upper cold troughs and warm ridges. *Subject Headings:* **1. Ozone-weather relation ships 2. Tromsö, Norway.**—*Author's abstract.*

10F–141 551.510.41:551.510.53

Junge, Christian E., **Atmospheric chemistry.** *Advances in Geophysics*, N. Y., 4:1–108, 1958 31 figs., 21 tables, 152 refs., eqs. **DWB, DLC**—The discussion of trace gases contained in this chapte includes a brief but detailed account of the more important problems, theories, and findings in ozon research. A survey is made of reliable recent measurements of representative tropospheric ozon values. Although the majority of the findings seem to support the thesis of the stratospheric origi of tropospheric ozone, some observations point to sources in low tropospheric layers. (For abstrac on the whole paper, *see* 9.9–16, Sept. 1958, *MAB.*) *Subject Headings:* **1. Atmospheric composition 2. Ozone.**—*R.P.*

10F–142 551.510.53

*Khrgian, A. Kh., **Fizika atmosfery.** [Physics of the atmosphere.] 2nd ed. Moscow, Gos Izdat. Fiziko-Matematicheskoĭ Literatury, **1958.** 476 p. 218 figs., 116 tables, numerous refs **DLC** (QC880.K45)—On p. 36–48 the author discusses atmospheric ozone, its role in the absorptio of solar radiation, its vertical and latitudinal distribution, seasonal and diurnal variations, metho of ozone measurement, the photochemical equilibrium of ozone, and processes of vertical and hor zontal transport. Ozone absorption in the visible spectrum is discussed on p. 122. *Subject Heading* **1. Ozone 2. Textbooks.**—*G.T.*

10F–143 551.510.42:541.1

*†Leighton, Philip A. and Perkins, William A. (*both, Stanford Univ.*), **Photochemical secondar reactions in urban air.** *Air Pollution Foundation, San Marino, Calif., Report*, No. 24, Aug. **1958** 212 p. 14 figs., 21 tables, 158 refs., numerous eqs. **DWB**—Primary and secondary photochemica processes which occur in urban air in the form of reactions of oxygen atoms with molecular oxygen of ozone with nitric oxide and with olefins; and of free radicals with oxygen, nitric oxide, and olefins or those compounds which occur in auto exhaust, are treated in extensive tables and discussed i detail. *Subject Headings:* **1. Photochemical reactions in urban air 2. Ozone photochemistry.**—*N.N*

10F–144 551.510.534:535.24

Shimizu, M. and Yamasaki, M. (*Aerological Obs.*), **Observation of the vertical distribution o ozone by an airborne spectrograph, Pt. 2.** *Tateno, Japan. Aerological Observatory, Journa* 6(2):69–71, Feb. **1958.** 2 figs., 2 refs. In Japanese; English summary p. 69. **DLC**—Observation were made with the instrument used last summer, by adding a UV filter in front of the slit of th spectrograph. Solar spectra were taken successively for ten-min. exposures, while the instrumen ascended from the ground to a higher level. In calculating the vertical distribution of ozon VIGROUX's absorption coefficient of ozone was adopted in place of NI TZI-ZE's used in 1956. *Subje Headings:* **1. Vertical ozone distribution 2. Spectrophotometric ozone determination.**—*Author abstract.*

10F–145 551.510.42:546.214:61

Stockinger, Herbert E. (*Public Health Service, Cincinnati*), **Evaluation of the hazards of ozon and oxides of nitrogen—factors modifying acute toxicity.** *Air Pollution Control Association, Journa* 8(2):129–137, Aug. **1958.** 8 tables, 18 refs. (Reprinted from the *A. M. A. Arch. Ind. Healt* 15:181–190, March **1957.**) **DLC**—Experimental evidence is presented that ozone in single, acut exposure is a highly poisonous substance to laboratory animals. No experimental evidence w found that this toxicity is modified to a significant degree by the presence of nitrogen oxides tha may accompany ozone production. Seven factors have been experimentally found that may modif the toxicity of ozone. Four of these—youth, physical exertion, alcohol and respiratory infection— tend to augment the injurious response or act to the detriment of the host; the remainder—inte mittent exposure, premedication, and preexposure either reduce or eliminate the injurious effects o ozone. Consideration is given these factors in the evaluation of possible acute hazards to populatio from ozone-containing smogs. *Subject Heading:* **1. Ozone effects on humans.**—*Author's summary*

10F–146 551.510.534:551.590.24:523.78(485)

*Svensson, Birger, **Observations on the amount of ozone by Dobson spectrophotometer during the solar eclipse of June 30, 1954.** *Arkiv för Geophysik*, Stockholm, 2(28):573–594, **1958.** 8 figs., 15 tables, 17 refs., 33 eqs. **DLC**—The possible effect of the eclipse of June 30, 1954 on atmospheric ozone content was investigated at the Meteorological Institute of the University of Uppsala. The contents of this paper include the following: observations on the standard wave length setting for routine measurements with the Dobson spectrometer, an equation for calculating the amount of ozone, graphs showing the amount of ozone computed from an individual wave length and from combinations of wave lengths, analysis of the irregularities exhibited by combination curves of wave lengths by an expression for $I_\lambda\ (0,\theta)$, the intensity of the radiation emitted by the sun in any wave length, λ, and at any angle θ, with respect to the normal drawn to the surface. Limb darkening in monochromatic light by solving the radiation transfer equation and observing the integral $I_\lambda\ (0,\theta)$ which yields the limb darkening for each wave length, namely $I_\lambda\ (0,\theta)/I_\lambda\ (0,0)$. The variations of I_0/I'_0 (i.e., the intensities of radiation from the sum of wave lengths as received on the outside of the earth's atmosphere) during an eclipse are calculated and theoretical ozone curves are computed for each wave length and also curves to which haze correction has been applied. It is concluded that the atmospheric ozone was in reality unaffected by the eclipse. *Subject Headings:* **1. Solar eclipse effects on ozone amount 2. Spectrophotometric ozone determination 3. Uppsala, Sweden.**—*I.L.D.*

10F–147 551.506.7(52)

*Tateno, Japan. Aerological Observatory, **Total amount of ozone over Tateno observed in 1957.** Its *Journal*, 6(2), Annex 5:99–110, Feb. **1958.** Almost entirely tables. In Japanese; English summary p. 99. **DLC**—Ozone over Tateno (36°N, 140°E) was measured up to 8 times a day from Feb. 22 to Dec. 31, 1957 Total amounts of ozone are tabulated for each measurement along with the time of observation, conditions of cloudiness and secant of the radiation path through the ozone layer. (For a continuation of these ozone data, *see* 10F–148.) *Subject Headings:* **1. Ozone data 2. Tateno, Japan.**—*G.T.*

10F–148 551.506.7:551.510.534(52)

Tateno, Japan. Aerological Observatory, **Bulletin,** No. 1, 1926(?)–. Latest issue seen, No. 1, Jan. **1959.** Monthly. Early issues as its **Bulteno** (in Esperanto), (1926–1936?). Currently issued in five sections: **1. Radiosonde data. 2. Winds aloft data. 3. Monthly results of radiosonde data. 4. Monthly results of winds aloft data. 5. Atmospheric ozone data. DLC** (QC990. J3T287)—Sec. 5 on atmospheric ozone was introduced in the Jan. 1958 issue and is now a regular feature of the Bulletin. It is a one-page tabulation of: a) total amount of ozone measured seven times a day by means of a spectrophotometer according to recommendations of the International Ozone Commission. Conditions under which the measurements were made (direct solar or lunar, or diffuse radiation; state of the sky) and the secant of the radiation path through the ozone layer are given for every observation. b) Umkehr observations made on clear zenith sky several times a month. *Subject Headings:* **1. Upper air data 2. Ozone data 3. Tateno, Japan.**—*G.T.*

10F–149 551.513.1:551.510.53(98)

§Teweles, S. and Finger, F. G. (*both, U. S. W. B., Wash., D. C.*), **An abrupt change in stratospheric circulation beginning in mid-January 1958.** *Monthly Weather Review*, Wash., D. C., 86(1):23–28, Jan. **1958.** 8 figs., 9 refs. **DWB, DLC**—Charts show 25 mb circulation (geopotential) and temps. for North America on Jan. 17, 24, 28, 29, Feb. 1 and Feb. 5, 1958—a period when there was a 25 mb cold pool over Arctic America, replaced abruptly by a warm air mass, and rapid displacement of the polar-night or Arctic jet stream, and subsequently by a return to a normal pattern. Comparative soundings taken in the warm air (Bethel, Alaska) and cold air (Eureka Sound) on Jan. 17, show magnitude of warming (−74°C to −37°C) in space, which was comparable to that in time. Ozone values at Alert and Resolute showed a marked increase from Jan. 4 to Feb. 1 (0.23 cm to 0.48 cm and 0.36 to 0.49 cm, respectively). *Subject Headings:* **1. Stratospheric warming, Jan. 1958 2. 25 mb temperature anomalies 3. Arctic jet stream 4. Arctic.**—*M.R.*

10F–150 551.508.952:551.510.41:546.214

Vassy, Arlette (*Faculté des Sciences, Paris*), **Appareil enregistreur donnant la concentration de l'ozone dans l'air.** [Recording instruments giving the ozone concentration in the air.] *Geofisica Pura e Applicata*, Milan, Vol. 39:164–173, Jan./April **1958.** 5 figs., 12 refs. English and French summaries p. 164. **DLC**—Description of recording instruments giving the ozone concentration near ground level by a chemical measurement; four of these instruments are operating at French IGY stations. The details of the mechanical parts and of their electrical controls are given, together with their recent improvements; the tests and verifications to which the method was submitted are explained and attention is drawn to some conditions required for the validity of the results. The

data collected until now have brought different conclusions which are briefly summarized. *Subject Headings:* **1. Ozone recorders 2. Ozone concentration.**—*Author's abstract.*

10F–151 551.510.534:551.515.8(494.246.2

Vassy, Arlette, **Concentration de l'air en ozone à la station scientifique du Jungfraujoch influence des fronts froids.** [Ozone content of air at the scientific station of Jungfraujoch; influenc of cold fronts.] *Académie des Sciences, Paris, Comptes Rendus*, 247(25):2409–2411, Dec. 22, 1958 3 refs. **DWB, DLC**—Measurements made at the station of Jungfraujoch, show an increase of th concentration of ozone with altitude. On the other hand, the author notes that days with a hig ozone content occur always before a cold front, and the increase begins more than 24 hrs before th passage of the front over the station. Cold fronts thus appear to be more of a determining factc than the storms which usually precede them. *Subject Headings:* **1. Ozone content of air 2.Col front effects of ozone 3. Jungfraujoch, Switzerland.**—*A.V.*

10F–152 551.508.95

Vassy, Arlette, **Radio-sonde spéciale pour la mesure de la répartition verticale de l'ozon atmosphérique.** [Special radiosonde for measuring vertical distribution of atmospheric ozone.. *Journal Scientifique de la Météorologie*, Paris, 10(38):63–75, April/June **1958.** 8 figs., table, 8 ref **DWB**—Description of a device with filters and photoelectric cell for measurement of the reduce ozone thickness above the instrument along the path of solar rays, and its adaption to the curren radio-sounding techniques permitting transmission of optical signals to the ground. The instrumen is composed of two parts: the radio sounding meter which gives pressure and temperature (altitude and the box containing the optical apparatus which gives the ozone thickness by electrical reductio of the absorption undergone by solar radiation. For optical measuring, the absorption propertie of ozone in the near ultraviolet are used. A detailed calculation shows the sensitivity of the devic Analysis of the raw data is discussed. *Subject Heading:* **1. Ozonesondes.**—*A.V. and author's abstrac*

1959

10F–153 551.510.53

Erdboden und Ozonschicht als energieumsetzende Schichten. [The ground and the ozon layer as energy transforming layers.] *Naturwissenschaftliche Rundschau*, Stuttgart, 12(4):14 April **1959. DLC**—Two papers are summarized: 1) A paper by A. ARNOLD and M. LOWENTHA delivered at an American Meteorological Society meeting on Oct. 14, 1956 in which results of balloo measurements of temperature made for one year over New Jersey to altitudes over 35 km are reporte and interpreted in terms of heating effects at the ground and in the ozonosphere; and 2) a paper b A. ATTMANNSPACHER delivered at the International Conference on Rockets and Space Flight i Bremen (Sept. 7, 1958) in which circulation processes below 20 km are derived from ground heatin effects and above 20 km from heating effects at the upper boundary of the ozone layer. Annua diurnal and nonperiodic variations of ozonosphere heating are considered in the two papers. *Subje Headings:* **1. Ozonosphere heating 2. Heat balance.**—*G.T.*

10F–154 551.510.534:535.3

†Gora, Edwin K., **The rotational spectrum of ozone.** *Journal of Molecular Spectroscopy*, N. Y 3(1):78–99, Feb. **1959.** 6 figs., 3 tables, 15 refs., 7 eqs.—Frequencies and intensities have bee calculated for the lines of the rotational spectrum of ozone which are likely to contribute noticeabl either to microwave absorption or to atmospheric absorption in the far infrared. The frequencie of these lines range from 0 to about 2,700,000 Mc/sec ($\sim$90 cm^{-2}). An estimate of the maximu absorption coefficient of the predicted lines is given for $T = 220°K$, the average temperature of th atmospheric ozone layer. The results obtained may also prove useful in the analysis of the rotation fine structure of the ozone bands. The values of the molecular constants used in the calculatio have been determined from the frequencies of ozone microwave absorption lines measured by HUGH and TRAMBARULO et al. *Subject Heading:* **1. Rotational ozone spectrum.**—*Author's abstract.*

10F–155 551.510.41:633.7

Heggestad, Howard E. and Middleton, John T., **Ozone in high concentrations as cause tobacco leaf injury.** *Science*, Wash., D. C., 129(3343):208–209, Jan. 23, **1959.** 2 tables, 9 ref **DLC**—Evidence obtained by means of rubber strip tests and an ozone recorder indicates the presen of abnormal concentrations of ozone in the atmosphere at times. Excellent correlation was obtaine between appearance of "weather fleck" in tobacco and high values for ozone. The great similarit between lesions occurring naturally and those produced by ozone in chambers also indicates tha ozone is the probable inciting agent of weather fleck. Varietal differences exist. Study of stomat action helped to explain variation in leaf injury. *Subject Headings:* **1. Abnormal ozone concentratio 2. Ozone concentration effects on tobacco leaves.**—*Authors' abstract.*

10F–156 551.508.952

Horwood, John H. (*Dept. Physiological Hygiene, Univ. Toronto*), **Measurement of ozone concentration.** *Air Pollution Control Association, Journal,* 9(1):42–43, May **1959.** 2 figs., table, 2 refs. **DWB, DLC**—A new type of ozonometer, which offers improvements over that developed by BRADLEY and HAAGEN-SMIT, is described by its inventor. The improved design provides an opportunity to determine when periods of peak concentration of ozone occur, showing (over a period of 1 or 2 days) the times of elevated concentration of ozone. *Subject Headings:* **1. Ozone meters 2. Ozone concentration measurement.**—*R.P.*

10F–157 535.34:546.214

Plass, Gilbert N., **Useful representations for laboratory band absorption measurements.** Ford Motor Co. Aeronutronic Systems, Inc., Glendale, Calif., Contract AF 19(604)-2166, ASI Publication U-401; Scientific Report No. 4, March 27, **1959.** 28 p. 11 figs., 2 tables, 16 eqs.—Three different methods for the representation of laboratory data on band absorption are discussed. Each method is valid over a considerable range of pressure and amount of absorbing gas; together they accurately represent the absorption for virtually all values of these variables by means of reasonably simple mathematical expressions. Since these approximations have a valid theoretical basis, they can be used to obtain reliable values of the absorption for pressures and amounts of absorbing gas outside of the original experimental range. The three methods are: (1) strong line approximation; (2) weak line approximation; (3) nonoverlapping approximation. Methods (1) and (2) are valid; regardless of weather or not, the absorption is weak or strong at the line centers. The regions of validity of each of these approximations are given for the Elsasser and statistical models. An analysis is made of the published data on the absorption of the 9.6μ band of ozone by these methods. *Subject Headings:* **1. Ozone spectroscopy 2. Absorption spectra.**

10F–158 551.510.534:551.508.952

Shimizu, M. and Yamasaki, M., **Observation of the vertical distribution of ozone by an airborne spectrograph, Pt. 3.** *Tateno, Japan. Aerological Observatory, Journal,* 6(3):93–96, Jan. **1959.** 2 figs., table, 3 refs. **DLC, DWB**—A direct measurement of the vertical distribution of ozone was made at Tateno on Aug. 11, 1958, with the same method used in the 1956, 1957 summers. In 1958, the driving of the photographic plate was controlled by a baro-switch at selected over ten pressures, instead of the time-switch used in 1956, 57. Three balloons could lift the instrument to 34 km, and 12 photographic records of solar ultraviolet spectrum were taken at various heights up to the ceiling. The calculated result from those spectra shows a maximum ozone concentration near 22 km, as usual and a minimum near 26 km as unusual. From an Umkehr curve which observed at Tateno on the same day, a vertical distribution of ozone was calculated and compared with the result of the air-borne spectrograph. *Subject Headings:* **1. Ozone measurement techniques 2. Air-borne spectrograph.**—*Authors' abstract.*

10F–159 551.510.534:551.507.321.2

Yamasaki, M. and Ikeda, H., **Ozone and rubber.** *Tateno, Japan. Aerological Observatory, Journal,* 6(3):131–136, Jan. **1959.** 5 figs., 7 refs. **DLC, DWB**—Preliminary experiments were made on the action of the atmospheric ozone to latex (natural rubber) of which sounding balloons are made. Test pieces of the rubber were stretched and folded around celluloid plates. They were lifted to the height more than 30 km. After landing, the folded parts of them were severely cracked, presumably, by the atmospheric ozone, and the flat parts slightly. The severity was heavy on the pieces which had been allowed smaller elongation in the flight. Such effects were not observed on pieces coated with silicon oil or castor oil. *Subject Headings:* **1. Rubber cracking 2. Ozone effects on balloons.**—*Authors' abstract.*

10F–160 551.510.534:551.590.24(52)

*Yamasaki, M. and Sakai, I., **Total amount of ozone over Tateno during the solar eclipse of April 19, 1958.** *Tateno, Japan. Aerological Observatory, Journal,* 6(3):97–106, Jan. **1959.** 3 figs., 5 tables, 8 refs., 7 eqs. **DLC, DWB**—On April 19, 1958, a solar eclipse gave the maximum obscuration 0.876 at 13h19m JST for Tateno. There were no clouds except the slight appearance of Cu during 9h40m–12h20m. The total amount of ozone was measured with the Dobson spectrophotometer No. 52 and another spectrophotometer 5703 (calibrated by No. 52) using light from the sun or from the zenith blue sky. Observations were made from early morning to evening by the wavelength settings A, C and D. Calculations for direct sun observation were made with wavelengths A, C and D, and pairs of wave lengths AD, AC and CD (Formulae 1, 2). As the absorption coefficient of ozone the new values (Vigroux's) were used (Table 1). During the eclipse it was considered the intensity ratio of the two wavelengths of each setting received at the outside of the atmosphere, varies depending to the degree of obscuration on the sun, because of its limb darkening. B. SVENSON's laborious calculation for the limb darkening was very helpful for our work. To evaluate the

ozone amount from zenith sky observations four charts were used; two of them, for C and AD wav lengths, were those supplied from the International Ozone Commission and partly revised at Tateno and charts for A and D were drawn at Tateno, but the chart for D was not so accurate. The effec of limb darkening was also considered, but the variation of the degree of obscuration with heigh was neglected, for levels in question are several ten kms. As the result of calculations, the tota amount of ozone showed a slight increase at the middle of eclipse (Fig. 3), but it seems that thi increase is not due to the eclipse, for the reasons that an increase of ozone of the same order occurre before the eclipse began (at about 10h), and such an increase at the middle of eclipse was not observe at other stations in Japan. *Subject Heading:* **1. Solar eclipse effects on ozone.**—*Authors' abstract.*

SUPPLEMENTARY MATERIAL

10F–161 551.510.534:551.51

Massey, Harrie Stewart Wilson and Boyd, R. L. F., **The upper atmosphere.** London, Hutchin son and Co., **1958. The ozonosphere and the ionosphere,** p. 121–149. figs., plates, tables, eqs **DLC** (QC879.M3)—One section of the chapter cited is devoted to the ozone layer (p. 129–136 The more reliable methods of observation and results obtained in investigating ozone concentratio and height distribution are presented in some detail, and a note of emphasis is given to the man connections between variations of ozone amount and weather conditions, all of which are importan to meteorologists. *Subject Headings:* **1. Ozone layer 2. Ozone-weather relationships 3. Textbooks** —*R.P.*

10F–162 551.521.18:551.510.53

Paetzold, H. K., **Zur Ultrarotabsorption des Ozons.** [Infrared absorption by ozone.] *Zei schrift für Naturforschung,* 11a(2):128–130, Feb. **1956.** 4 figs., refs. **DLC**—The pressure dependenc of the 9.6μ band of atmospheric ozone is investigated by means of vertical ozone distribution measure ments made at Weissenau. A new technique is obtained for indirect determination of vertica ozone distribution by measurements from the ground which may be useful as a complement t direct measurements during balloon ascents. *Subject Headings:* **1. Infrared absorption spectrun 2. Vertical ozone distribution 3. Weissenau, Germany.**—*Transl. of author's abstract.*

10F–163 551.521.17:551.510.53

Sekihara, K., Murai, K., and Kano, M., (*all, Met. Res. Inst., Tokyo*), **Studies of the distributio of ultraviolet sky radiation, Pt. 8, on the effect of the ozone absorption layer.** *Papers in Meteorolog and Geophysics,* Tokyo, 8(4):292–301, Jan. **1958.** 9 figs., 12 refs., 3 eqs. **DWB**—Using a photo multiplier tube and filters, the intensities of ultraviolet sky radiation from various directions wer measured at Mt. Norikura in the summer of 1957. The measurement was made in two differen wave-length ranges, i.e., 3200 Å and 3300 Å or so respectively, with the aim of finding the effect of th ozone layer in the upper atmosphere. The measurement of the intensities of UV sky radiation wa made in three directions in the principal meridian plane, that is, in the zenith distance of 15° toward the sun, just in the zenith and in that of 15° backward of the sun. Also each measurement wa carried out at every four or five minutes during the time when the sun's altitude was from 0° to 30 The relative values were computed at each instant taking the values in the zenith as a unit. The their time variation was examined, especially in view of its difference between the two wave length Investigating the results of observation a rapid increase of the difference was pointed out when th sun's altitude was lower than two or three degrees. These phenomena were theoretically analyze computing the primary scattered intensities in the atmosphere with a typical absorption layer an also without it. And the above-mentioned feature was proved to be the effect of an ozone absorptio layer. Thus a new method of determining the vertical distribution of the atmospheric ozone wa suggested. *Subject Headings:* **1. Ultraviolet radiation measurement techniques 2. Vertical ozon distribution 3. Mt. Norikura, Japan.**—*Authors' abstract.*

10F–164 551.510.41:551.508.95

Tamutis, P. K., **O kolichestvennom izmerenii ozona v atmosfere metodom fotoschetchika** [Quantitative measurement of atmospheric ozone by means of a photoelectric counter.] *Lietuvo TSR Mokšlu Akademija. Geologijos ir Geografijos Institutas, Moksliniai Pranešimai,* Vol. Geofizika, Hidroligija, issued Vilna, **1956.** p. 43–47. 3 figs., 3 refs., 8 eqs.—The purpose of th study reported in this paper was simply the available optical method of determining the amount o atmospheric ozone near the earth's surface. The apparatus developed for this purpose is describe and illustrated. Its principal parts are an ultraviolet light source (mercury lamp), monochromato photoelectric cell, amplifier, oscillograph and recorder. The light intensities measured yield ozon amounts according to a simple formula. Experimental listing of the method and comparison wit the earlier optical method have shown it to be accurate. Sample data are presented. *Subje Headings:* **1. Ozone measurement techniques 2. Photoelectric counters.**—*G.T.*

10F–165 551.510.534:546.214:616

Wilkins, E. W. C., **Ozone as a hazard in high altitude flying.** *North Atlantic Treaty Organization. Advisory Group for Aeronautical Research and Development, Report,* No. 203, Sept. **1958.** 22 p., 9 figs., 3 tables, 29 refs. **DWB** (629.1308 N864r)—A brief review of available knowledge on the formation and vertical distribution of ozone in the atmosphere and on the biological effects of ozone leads to the conclusion that there is what may be called an ozone barrier extending from about 50,000 ft to 150,000 ft. Possible methods of protection against this hazard are discussed. The need for more precise data on ozone distribution is stressed. *Subject Headings:* **1. Vertical ozone distribution 2. Ozone effects on humans.**—*G.T.*

10F–166 551.521.3:546.214

Dave, J. V. and Sekera, Z. (*Univ. of California*), **Effect of ozone on the total sky and global radiation received on a horizontal surface.** *Journal of Meteorology,* Boston, 16(2):211–212, April **1959.** fig., 2 tables, 3 refs. **DWB, DLC**—Deirmendjian and Sekera (1954) computed the total sky radiation and total global radiation on a horizontal surface, taking into consideration all the orders of scattering and reflection by ground according to Lambert's law. Reliable measurements made by Liljequist in the Arctic are at variance with the theoretical results. In this note the authors show that the discrepancy may be due to neglect of ozone absorption. An approximate calculation of the magnitude of ozone absorption yields results in good agreement with the measurements of Liljequist. *Subject Headings:* **1. Ozone effects on global radiation 2. Radiation computations.**—*G.T.*

10F–167 551.510.534:546.214:551.507.362.2

Singer, S. F. and Wentworth, R. E. (*both, Dept. of Physics, Univ. of Md., College Park, Md.*), **A method for the determination of the vertical ozone distribution from a satellite.** *Journal of Geophysical Research,* Washington, D. C., 62(2):299–308, June **1957.** 6 figs, 4 tables, 14 refs., 11 eqs. **DLC**—Because of its long lifetime below 45 km, ozone can deviate markedly from the concentration given by the photochemical equilibrium considerations. Hence, the ozone concentration can be used as an indicator of the motion of air masses, particularly in the stratosphere. The meteorological implications can be fully realized only by the synoptic measurements, for which an artificial earth satellite is ideally suited. The method described employs the optical absorption properties of ozone in the ultraviolet region around 2900 A. A detector looking down towards the earth will receive solar ultraviolet scattered by the atmosphere which has been attenuated both by scattering out and by ozone absorption. Calculations are presented to illustrate the effective depth in the atmosphere to which the detector "sees," the effective depth being defined as the point above which 90% of the contribution to the detector response is made. The sensitivity of the method to changes in the ozone concentration at various altitudes is also demonstrated. *Subject Headings:* **1. Vertical ozone distribution 2. Satellite ozone observation.**—*Authors' abstract.*

10F–168 551.510.535:546.214:551.515(282.247.4)

Britaev, A. S.; Iozenas, V. A. and Kuznetsov, A. P., **K voprosu o sviazi obshchego soderzhaniia ozona s meteorologicheskimi usloviiami.** [On the question of the connection between total ozone content and meteorological conditions.] *Meteorologiia i Gidrologiia,* Leningrad, 10:24–29, Oct. **1958.** fig., table, 9 refs., 2 eqs. **DWB, DLC.** Translated by Army Ordnance Missile Command, Redstone Arsenal, Alabama, as its Translation No. 1, Feb. **1959.** 6 p. **DWB** (M10.534 B862on)—The variation of total content of atmospheric ozone and of simultaneous meteorological elements was investigated in Lower Povolzh'e, which is characterized by low cloud cover and high atmospheric transparence. Measurements were made from April 27 to June 8, 1957 at a point having coordinates 48°13'N. lat. and 45°44'E. long. The photoelectric spectrophotometer (modification of Dobson instrument) was used. Atmospheric transparence was measured with a thermoelectric actinometer. Simultaneous observations on the meteorological elements were made with standard apparatus and radiosondes. The formula used in computing ozone amounts is discussed. The total atmospheric ozone varies inversely with the height of the tropopause. Higher ozone values coincide with low pressure at the surface of the earth; air temperature at 2 m has a poorer correlation with ozone content than atmospheric pressure. Extreme values of total ozone content precede extreme values of troposphere height by 24 hours. Data obtained indicate that one of the principal causes of variation in the atmosphere up to 20–25 km is the changes in the atmosphere in lower layers; that tropospheric processes are connected with the stratosphere and that the establishment of equilibrium between formation and destruction of ozone occurs over long time intervals amounting to tens of hours. A detailed account of the ozone and tropopause variation for individual days, and the relationship between these and particular air mass and frontal conditions are presented. It is evident that cold air is associated with high atmospheric ozone content and warm air with a lower ozone content; the former is associated with a low troposphere, the latter with a high one. *Subject Headings:* **1. Ozone—weather relationships 2. Lower Volga region.**—*I.L.D.*

PART III. REVIEWS, TRANSLATIONS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Brown, Robert Hanbury and Lovell, A. C. B.: **The exploration of space by radio.** London, Chapma and Hall, 1957. 207 p. 132 figs. Price, 35 sh. Review by T. Krishnan in *Journal of Scientif Research, Sec. A*, New Delhi, 18(3):141–142, March 1959.

Metcalfe, John: **Information indexing and subject cataloging: alphabetic, classified, coordinat mechanical.** N. Y., Scarecrow Press, 1957. 338 p. Price, $6.50. Review by Lea M. Bohne in *Science*, Wash., D. C., 128(3335):1336–1337, Nov. 28, 1958.

National Atlas of India. Issued by the National Atlas Organization. Ed. by S. P. Chatterje Printed, Calcutta, Survey of India Office, 1957. "Preliminary ed." Price, popular editio Rs. 100.00. 26 plates and 38 inset maps. Review by S. K. Ghose in *Indian Journal of Meteo ology and Geophysics*, 10(1):110–111, Jan. 1959.

Orr, Clyde: **Between earth and space.** N. Y., Macmillan, 1959. 253 p. Price, $4.95. Revie by H. E. Landsberg in *Science*, Wash., D. C., 129(3361):1480, May 29, 1959.

Physics and chemistry of the earth, Vol. 2, ed. by L. H. Ahrens et al. N. Y., Pergamon Press, 195 259 p. figs., tables, bibliogs., eqs. Review by F. Steinhauser in *Archiv für Meteorologi Geophysik und Bioklimatologie, Ser. A*, 11(1):155–156, 1959.

UNESCO: **Climatology—reviews of research.** Its *Arid Zone Research*, No. 10, pub. Paris, 195 190 p. Price, 25 sh. Review by V. P. Subrahmanyam in *Indian Journal of Meteorology an Geophysics*, 10(1):109, Jan. 1959. (*For abstract on this title, see* 10.1–6, Jan. 1959, *MAB*)

B. TRANSLATIONS AND RECENT MONOGRAPHS

TRANSLATIONS

Al'pert, Ia. L.: **Method of investigating the ionosphere using an artificial earth satellite.** (Trans of the original Russian, **O metode issledovaniia ionosfery s pomoshch'iu iskusstvennogo sputnik Zemli,** in *Uspekhi Fizicheskikh Nauk*, Moscow, 64(1):3–14, Jan. 1958. 3 figs., refs., eqs Transl. issued by U. S. Joint Publications Research Service, N. Y., 1958. 14 p. Trans available DWB (M10.535 A456me)

Berger-Landefeldt, U.: **Measurement of humidity in microclimatology and plant ecology.** (Trans of original German, **Zur Messung der Feuchtigkeit in der Mikroklimatologie und Pflanzen kologie,** in *Berlin. Freie Universität. Institut für Meteorologie und Geophysik, Meteorologisc Abhandlungen*, 2(4):173–195, 1955. figs., 89 refs.) Transl. available Commonwealth Scientif and Industrial Research Organization (CSIRO), Information Service, 314 Albert St., Ea Melbourne C, Victoria as its CSIRO 3588. (*For abstract on original German, see* 7.2–71, Fe 1956, *MAB*)

Chaplygina, A. S.: **Numerical methods for forecasting a baric field in the atmosphere.** (Trans of original Russian, **O chislennykh metodakh prognoza baricheskogo polia v atmosfere,** *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 6:823–826, June 1957. tables, refs., eqs Transl. by A. K. Henn issued in the English language edition of the **Izvestiia,** *Bulletin of t Academy of Sciences of the U.S.S.R., Geophysics Series* (issued by American Geophysical Union No. 6:160–165, 1957. Transl. available DWB

Piccard, Auguste: **Über den Wolken unter den Wellen.** (Transl. of original French, *Au fond d mers en bathyscaphe*, issued Paris, Arthaud, 1954. 291 p. figs., photos.) German transl. 2d enl. ed., Issued Wiesbaden, F. A. Brockhaus. 1958. 303 p. figs., photos. Available DWB (9

P587ub). An English transl. by Christina Stead issued as **Earth, sky and sea,** N. Y., Oxford Univ. Press, 1956. 192 p. Another English language ed. issued with title **In balloon and bathyscaphe,** London, Cassell, 1956. (*For abstract on French and English editions, see* 8.7–15, July 1957, *MAB*)

Shternfel'd, A. A.: **Artificial satellites.** (Transl. of original Russian of 2d rev. and extended ed., **Iskusstvennye sputniki,** pub. Moscow, 1958.) Trans. has 424 p., 58 figs., 32 plates, 51 tables, 6 refs. Available for reference, DWB (629.1388 S561isE, 1958) (*See* 10.1–32, Jan. 1959, *MAB, for abstract on 1956 first ed.*)

RECENT MONOGRAPHS

Barnes, H.: **Oceanography and marine biology: a book of techniques.** London, Allen & Unwin, 1958. 220 p. 110 figs. Price, 35 sh.

Bussati-Traverso, A. A. (ed.): **Perspectives in marine biology: a symposium held at Scripps Institution of Oceanography, Univ. of California, March 24–April 2, 1956.** Pub. Berkeley, Univ. of California Press, 1958. 621 p. 181 figs.

Callaghan, F. R. (ed.): **Science in New Zealand.** Wellington, N. Z., A. H. and A. W. Reed; London, Bailey and Swinfen, 1957. 272 p. Price, 22 sh 6 d.

Galbraith, William: **Extensive air showers.** London, Butterworths Scientific Publications, 1958. 211 p. 54 figs., 12 plates. Price, 21 sh.

Harrison, J. A.: **Story of the ionosphere.** London, Hulton Educational Publications, 1958. 103 p. 123 figs. Price, 10 sh 6 d.

Miller, Arthur Austin and Parry, M.: **Everyday meteorology.** London, Hutchinson, 1958. 270 p. 22 plates, 77 figs. Price, 30 sh.

C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Alma-Ata, Kazakhstan. Kazakhskii Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy, No. 2, 1954

Korovin, V. I.: **Prognoz vesennego polovodiia gornykh rek pri otsutstvii snegos"emok i vysokogornykh stantsii,** [Forecasting spring high-water in the absence of snow surveys and high mountain stations], p. 4–8

Kopyt, A. D.: **Zavisimost' vesennikh zapasov pochvennoĭ vlagi ot meteorologicheskikh uslovii osenne-zimnego perioda v Kazakhstane,** [Dependence of soil moisture reserve in spring upon meteorological conditions during the fall-winter season in Kazakhstan], p. 9–22

Bezverkhniĭ, Sh. A.: **O nekotorykh osobennostiakh ul'trafioletovoĭ prozrachnosti atmosfery,** [Some properties of the ultraviolet transparency of the atmosphere], p. 23–31

Gel'mgol'ts, N. F.: **Nekotorye soobrazheniia o klassifikatsii oblakov,** [A few considerations concerning cloud classification], p. 32–39

Bezverkhniaia, R. Ts. and Gel'mgol'ts, N. F.: **O prakticheskom opredelenii koeffitsienta turbulentnosti v svobodnoĭ atmosfere,** [Practical determination of the turbulence coefficient in the free atmosphere], p. 40–44

Orlova, R. T.: **O dostatochnosti chisla nabliudeniĭ dlia polucheniia v aerologii sredneĭ temperatury zadannoĭ tochnosti,** [On the number of observations required in aerology for obtaining a mean temperature of given accuracy], p. 45–51

Gel'mgol'ts, N. F.: **K usovershenstvovaniiu i uskoreniiu obrabotki aerologicheskikh nabliudeniĭ,** [Improvement and speeding up of aerological data analysis], p. 52–58

American Meteorological Society, Bulletin, Vol. 40, No. 5, May 1959

Hansen, Frank V. and Taft, Paul H.: **Plotting systems for the evaluation of double-theodolite balloon-measured winds,** p. 221–224

Harker, George S.: **Whiteout—a bibliographical survey,** p. 225–229

Smith, Robert L.: **RHI radar observation of a funnel cloud,** p. 230–232

Vederman, Joseph and Dubofsky, Bernard: **An operational technique for the forecasting of flow patterns in the upper troposphere,** p. 233–239

Thomas, H. E.: **Reservoirs to match our climatic fluctuations,** p. 240–249

Rigby, Malcolm: **[Obituary note on] Gerald C. Bristow,** p. 269

Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B, Vienna, Vol. 10, No. 1, 1959

Berg, Hellmut: **Richtlinien für eine an der Biometeorologie des Menschen ausgerichtete Klimaklassifikation,** [Basic principles of a climatic classification oriented toward human biometeorology], p. 1–16

Dammann, W.: **Untersuchung über Schwankungen der Winterniederschläge in Deutschland,** [Investigations on the variations of winter precipitation in Germany], p. 17–37

Steinhäusser, Hans: **Trocken- und Niederschlagsperioden und ihre theoretische Behandlung,** [Dry and wet periods and their theoretical treatment], p. 38–58

Hisdal, V.: **On the relative spectral distribution of the radiation from the zenith sky,** p. 59–68

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Volz, F.: **Photometer mit Selen-Photoelement zur spektralen Messung der Sonnenstrahlung und zur Bestimmung der Wellenlängenabhängigkeit der Dunsttrübung,** [Photometer with a selenium photoelement for the spectral measurement of solar radiation and for the determination of the wave length dependence of haze turbidity], p. 100–131

Bangerl, Anna and Steinhauser, F.: **Die Verteilung des SO_2-Gehaltes der Luft im Stadtgebiet von Wien,** [The distribution of SO_2 content of air in the metropolitan area of Vienna], p. 132–153

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Defant, A.: **Il problema della corrente del Golfo,** [Problem of the Gulf Stream], p. 17–31

Aliverti, G.: **Sulle crociere talassografiche nel Tirreno durante l'A.G.I. 1957–58,** [Ocean cruises in the Tyrrhenian Sea during the International Geophysical Year, 1957–58], p. 33–44.

Picotti, M.: **Moderni metodi e ricerche di chimica nel mare,** [Modern methods and research on chemistry of the sea], p. 45–47

Picotti, M.: **Primi risultati delle crociere talassografiche 1955 e 1957 nell'Adriatico,** [First results of the 1955 and 1957 Adriatic ocean cruises], p. 49–51

Imbò, G.: **Temperature d'irrigidimento e viscosità magmatica,** [Solidification temperature and viscosity of magma], p. 53–60

Mosetti, F.: **Recenti sviluppi delle ricerche con l'analisi periodale,** [Recent developments in research on periodicity analysis], p. 61–71

Sarrica, O.: **Una caratteristica evoluzione degli echi radar provenienti da temporali,** [Typical development of radar echoes from thunderstorms], p. 73–85

Polli, S.: **Le sesse (seiches) dell'Adriatico,** [Seiches of the Adriatic], p. 87–94

Vittozzi, P. and de Martino, M.: **Analisi radioattiva delle lave vesuviane col metodo dei fotomoltiplicatori,** [Radioactive analysis of the Vesuvius lava using scintillation counters], p. 95–98

Mariani, F.: **Sulla teoria delle maree atmosferiche gravitazionali,** [Theory of gravitational tides in the atmosphere], p. 99–108

Pacella, G. B.: **L'attrito di marea ed il ritardo della rotazione diurna terrestre; esame dell'effetto del ritardo sull'area della superficie terrestre,** [Tidal friction and retardation of the earth's diurnal rotation: analysis of the effect of retardation upon the surface area of the earth], p. 109–113

Rosini, E.: **Un metodo di confronto fra regimi anemologici,** [Method of comparing wind regimes], p. 115–124

Astronautica Acta, Vienna, Vol. 5, No. 1, 1959

Davis, Robert J.: **The radar appearance of a rotating corner reflector,** p. 1–14

Sänger, Eugen: **Strahlungsquellen für Photonenstrahlantriebe,** [Sources of radiation for photonic jet propulsion], p. 15–25

Merson, R. H.: **Techniques of analysing terrestrial radio and optical observations of earth satellites,** p. 26–39

Nonweiler, T.: **The motion of an earth satellite on re-entry to the atmosphere,** p. 40–62

Price, E. W.: **Combustion instability in solid propellant rocket motors,** p. 63–72

Gerathewohl, Siegfried J. and Steinkamp, George: **Human-factor requirements for putting a man in orbit,** p. 73–84

Astrophysical Journal, Chicago, Vol. 127, No. 3, May 1958

Behring, W. E.; McAllister, H. and Rense, W. A.: **Ultraviolet emission lines in the solar spectrum,** p. 676–679
Zirker, J. B.: **The metallic chromosphere at the Khartoum eclipse,** p. 680–713
Jefferies, J. T. and Orrall, F. Q.: **On the interpretation of prominence spectra, Pt. 1, Balmer series line widths,** p. 714–725
Correll, Malcolm and Roberts, Walter Orr: **Atmospheric magnetic fields above active solar region of April 13, 1950,** p. 726–730
Bennett, Willard H.: **Auroral and magnetic-storm theory,** p. 731–742
Hess, Seymour L.: **Blue haze and the vertical structure of the Martian atmosphere,** p. 743–750
Gilvarry, J. J.: **The nature of the lunar maria,** p. 751–762

Vol. 129, No. 1, Jan. 1959

Bretz, Marianne C. and Billings, Donald E.: **Analysis of emission corona 1942–1955 from climax spectrograms,** p. 134–145
Jefferies, John T.; Smith, Elske v.P. and Smith, Henry J.: **The flare of September 18, 1957,** p. 146–163
Athay, R. G.: **The number of spicules in the middle chromosphere,** p. 164–171
Boggess, Albert, III and Dunkelman, Lawrence: **Ultraviolet reflectivities of Mars and Jupiter,** p. 236–237

Vol. 129, No. 2, March 1959

Mitchell, Walter E., Jr.: **The distribution of electron pressure in the solar photosphere,** p. 369–374
Unno, Wasaburo: **Turbulent motion in the solar atmosphere, Pt. 1, Doppler widths of photospheric lines,** p. 375–387
Unno, Wasaburo: **Turbulent motion in the solar atmosphere, Pt. 2, Turbulent velocities in the lower chromosphere,** p. 388–400
Jefferies, John T. and Thomas, Richard N.: **Source function in a non-equilibrium atmosphere, Pt. 3, The influence of a chromosphere,** p. 401–407
Tandberg-Hanssen, E. and Zirin, H.: **Physical conditions in limb flares and active prominences, Pt. 1, The loop prominences of November 12 and 22, 1956,** p. 408–413
Zirin, Harold: **Physical conditions in limb flares and active prominences, Pt. 2, A remarkable limb flare, December 18, 1956,** p. 414–423
Sears, R. L.: **An evolutionary sequence of solar models,** p. 489–495
Beard, David B.: **Interplanetary dust distribution,** p. 496–506

Australian Journal of Physics, Melbourne, Vol. 12, No. 1, March 1959

Gardner, F. F.: **The effect of sudden ionospheric disturbances (S.I.D.'s) on 2.28 Mc/s pulse reflections from the lower ionosphere,** p. 42–53
Weiss, A. A.: **Theory of the radio-echo meteor height distribution in a non-isothermal atmosphere,** p. 54–64
Weiss, A. A.: **Elevation, height, and electron density of echoing points of meteor trails,** p. 65–76
Loughhead, R. E. and Bray, R. J.: **Observations of faculae bordering small sunspots near the limb,** p. 97–99

Ciel et Terre, Brussels, Vol. 75, No. 1/2, Jan./Feb. 1959

Grandjean, Jules: **Chimie et radioactivité atmosphériques,** [Atmospheric chemistry and radioactivity], p. 1–25
Poncelet, Lucien: **A propos du rayon vert,** [The green flash], p. 25–27
Koeckelenbergh, A.: **L'éruption chromosphérique du 9 avril 1956 et ses phénomènes associés,** [The chromospheric eruption of April 9, 1956, and its associated phenomena], p. 28–33
Koeckelenbergh, A.: **Activité solaire en 1957,** [Solar activity during 1957], p. 34–43
Dufour, Louis: **Chroniques des événements météorologiques anciens d'après les lettres de Madame de Sévigné, Pt. 2,** [Chronicle of ancient meteorological events according to letters of Madame de Sévigné, Pt. 2.], p. 44–59
Sneyers, R.: **Le temps en novembre et décembre 1958,** [The weather during November and December 1958], p. 66–70

Geophysical Journal, London, Vol. 2, No. 1, March 1959

Parkinson, W. D.: **Directions of rapid geomagnetic fluctuations**, p. 1–14
Hales, A. L. and Sacks, I. S.: **Evidence for an intermediate layer from crustal structure studies in the eastern Transvaal**, p. 15–33
Hargraves, Robert B. and Fischer, Alfred G.: **Remanent magnetism in Jurassic red limestones and radiolarites from the Alps**, p. 34–41
Jeffreys, Harold: **The reduction of gravity observations**, p. 42–44
Garland, G. D.: **Current research in geophysics in Canada**, p. 45–50
Irving, E.: **Palaeomagnetic pole positions: a survey and analysis**, p. 51–79
15th meeting of the European Association of Exploration Geophysicists, p. 80–83

Journal of Atmospheric and Terrestrial Physics, London, Vol. 14, No. 1/2, April 1959

French, W. R., Jr. and Chasson, R. L.: **Atmospheric effects on the hard component of cosmic radiation near sea level**, p. 1–18
Weiss, A. A.: **The limitations of narrow-beam radio equipment in the detection of weak meteor showers**, p. 19–30
Rastogi, R. G.: **Geomagnetic influence on the *F1*- and *F2*-regions of the ionosphere-effect of solar activity**, p. 31–40
King, J. W.: **Ionospheric self-demodulation and self-distortion of radio waves**, p. 41–49
Titheridge, J. E.: **Ray paths in the ionosphere: approximate calculations in the presence of the earth's magnetic field**, p. 50–62
Reid, G. C. and Collins, C.: **Observations of abnormal VHF radio wave absorption at medium and high latitudes**, p. 63–81
Manning, L. A.: **Oblique echoes from over-dense meteor trails**, p. 82–93
Rao, B. Ramachandra and Rao, E. Bhagiratha: **Study of horizontal drifts in the *F1*- and *F2*-regions of the ionosphere at Waltair [17°43′N, 83°18′E, mag. lat. 9°30′N]**, p. 94–106
Harang, L. and Tröim, J.: **Determination of the angle of arrival of auroral echoes**, p. 107–110
Abbott, W. N. and Chapman, S.: **On the aurora of August 19, 1950, photographed from Greece**, p. 111–122
Thomas, L.: **Some measurements of horizontal movements in region-*F2* using widely spaced observing stations**, p. 123–137
Beynon, W. J. G. and Brown, G. M.: **Geomagnetic distortion of region-*E***, p. 138–166
Runcorn, S. K.: **On the hypothesis that the mean geomagnetic field for parts of geological time has been that of a geocentric axial multipole**, p. 167–174
Piggott, W. R.: **A rapid method of obtaining accurate virtual heights from an ionogram**, p. 175–177
Arthurs, A. M.: **Cross-sections for *K*-shell ionization of atomic nitrogen and oxygen by electrons and protons**, p. 177–179
Dieminger, W.; Möller, H. G. and Rose, G.: **Further results of sweep-frequency oblique-incidence pulse transmissions**, p. 179–180
Indices of geomagnetic activity for the Observatories Hartland (*Ha*), Eskdalemuir (*Es*) and Lerwick (*Le*) October and November 1958, p. 181–182

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Sapozhnikova, S. A.: **Agroklimaticheskie zony Ukrainy**, [Agroclimatic regions of the Ukraine], p. 3–9
Lichikaki, V. M.: **Otsenka agroklimatichekikh usloviĭ perezimovki ozimykh na territorii Ukrainskoĭ SSR**, [Evaluation of the agroclimatic conditions for the wintering of crops in the Ukrainian S.S.R.], p. 10–23
Kekukh, A. M. and Mikhaĭlova, N. I.: **Vodopotreblenie sakharnoĭ svekly v raĭonakh svekloseianiia Ukrainy**, [Water requirements of sugar beets grown in the sugar beet region of the Ukraine], p. 24–45
Iovenko, N. G. and Galinskaia, M. S.: **Vodnyĭ rezhim pochvy v sviazi s novoĭ sistemoĭ obrabotki**, [Soil water regime under the new tillage system], p. 46–55
Kopachevskaia, M. N.: **Razmeshchenie minimal'noĭ temperatury v 2-metrovom prizemnom sloe vozdukha vesnoĭ i osen'iu**, [Minimum temperature distribution within a 2-meter air layer above the ground during spring and fall], p. 56–70

Buchinskiĭ, I. E.: **O sviazi meteorologicheskikh elementov po nabliudeniiam na ploshchadke stantsiĭ i na poliakh v sukhoveĭnye dni,** [Relationship between meteorological elements according to observations made at a meteorological station and in fields on sukhovei days], p. 71–78

Goĭsa, N. I.: **Metodika rascheta mesiachnykh summ rasseiannoĭ i summarnoĭ radiatsii po srochnym nabliudeniiam,** [Methods of computing monthly totals of diffuse and global radiation from regular observations], p. 79–90

Borisov, A. A.: **O meteorologicheskoĭ effektivnosti orosheniia i lesnykh polos v raĭone trassy Severo-Krymskogo kanala,** [Meteorological effectiveness of irrigation and forest belts along the North Crimean canal], p. 91–98

Sudakevich, O. E.: **Mikroklimaticheskaia kharateristika morozoopasnosti territorii Nikitskogo botanicheskogo sada,** [Microclimatic characteristic of frost danger in the Nikitskiĭ Botanical Garden], p. 99–100

Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy, No. 73, 1958, [Fizika atmosfery [Physics of the atmosphere]]

Nikandrov, V. Ia.: **Priroda obrazovaniia kapelek i l'dinok v usloviiakh bol'shikh peresyshcheniĭ,** [Characteristics of droplet and ice particle formation under conditions of considerable supersaturation], p. 3–11

Krasikov, P. N. and Bashkirova, G. M.: **Meteorologicheskie usloviia pri zimnikh angarskikh tumanakh v raĭone g. Irkutska,** [Meteorological conditions during winter fogs over the Angara River in the Irkutsk City area], p. 12–23

Vorontsov, P. A.: **Aerologicheskie issledovaniia tumanov ispareniia r. Angary,** [Aerologic studies of evaporation fogs over the Angara River], p. 24–36

Bashkirova, G. M. and Krasikov, P. N.: **Nekotorye mikrofizicheskie kharakteristiki zimnikh Angarskikh tumanov v raĭone g. Irkutska,** [Some microphysical characteristics of winter fogs over the Angara River in the Irkutsk City area], p. 37–49

Bazilevich, V. V.: **Vliianie atmosfernoĭ turbulentnosti na slyshimost' zvukov v atmosfere,** [Atmospheric turbulence effects on sound audibility in the atmosphere], p. 50–53

Tverskoĭ, N. P.: **Akusticheskaia kharakteristika turbulentnogo sostoianiia atmosfery,** [Acoustic characteristics of atmospheric turbulence], p. 54–60

Vorontsov, P. A.: **Aerologicheskie issledovaniia pogranichnogo sloia atmosfery nad melkosopochnym rel'efom tselinnykh zemel',** [Aerological investigations of the lowest atmospheric layer over hilly terrain in virgin land], p. 61–86

Vorontsov, P. A.: **O brizakh Ladozhskogo ozera,** [Ladoga Lake breezes], p. 87–106

Vorontsov, P. A.; Mikhel', V. M. and Erler, A. A.: **Ispol'zovanie radioupravliaemykh aviamodeleĭ dlia aerologicheskikh issledovaniĭ nizhnikh sloev atmosfery,** [Utilization of guided model airplanes for aerological investigations of the lower layers of the atmosphere], p. 107–115

Makhotkin, L. G. and Solov'ev, V. A.: **O roli elektricheskikh zariadov pri koaguliatsii kapel' tumana,** [Role of electric charges in the coagulation of fog drops], p. 116–122

Tverskaia, N. P.: **Opytnoe izuchenie soudareniia i sliianiia zariazhennykh kapel',** [Study of the collision and coalescence of charged drops], p. 123–131

Mariner's Weather Log, Wash., D. C., Vol. 3, No. 2, March 1959

James, Richard W.: **Weather routing of ships,** p. 31–34

Johnson, Charles B.: **Great Lakes storm of November 17 and 18, 1958,** p. 35–36

Quinn, Eugene H.: **Tropical storms in the eastern North Pacific, 1958,** p. 37–39

Shinners, Willard W.: **Three hour pressure tendency and change,** p. 40

Vol. 3, No. 3, May 1959

Engelbrecht, Howard H.: **Early winter ice conditions on the upper Chesapeake Bay in 1958–1959,** p. 65–68

Typhoons and tropical storms of the western North Pacific, 1958, p. 68–75

Sik, A. E.: **Weather Bureau service for Great Lakes shipping during the 1958 navigation season,** p. 76–77

Ahrens, Robert J.: **Lake Michigan water temperatures,** p. 77–78

[Obituary of] Gerald C. Bristow, p. 79–80

Meteorological Magazine, London, Vol. 88, No. 1,041, March 1959

Tinn, A. B.: **Rainfall analysis at Woodthorpe, Nottinghamshire,** p. 65–66
Booth, R. E.: **The weather of 1958 in the British Isles,** p. 66–67
Thomas, D.: **The tattering rate of flags as an index of exposure to wind,** p. 67–70
Frost, R.: **The rate of ascent of free balloons,** p. 70–74
Meteorological Office Discussion [on] Forecasting cirrus, Nov. 17, 1958, p. 74–83
Gornergletscher Glaciological Survey 1959–60, p. 90
Basu, S.: **[Obituary of] Sir Gilbert Thomas Walker,** p. 90–91
[Obituary of] John Crichton, p. 91–92
Carter, H. E.: **[Obituary of] Leonard Henry Powers,** p. 92

Vol. 88, No. 1,042, April 1959

Hogarth, D. F.; Radok, U. and Schultz, K. G.: **Some upper wind observations for the tropical Indian Ocean,** p. 97–104
Thomas, E. R.: **Visibility and surface wind at Manchester airport,** p. 104–109
Booth, R. E.: **Temperature gradient at Blackpool,** p. 110–111
Halo complex, March 2, 1954, p. 119

Solar Energy, Phoenix, Arizona, Vol. 2, No. 3/4, July/Oct. 1958

Czarnecki, J. T.: **Performance of experimental solar water heaters in Australia,** p. 2–6
Hsu, S. T. and Leo, B. S.: **A simple reaction turbine as a solar engine,** p. 7–11
Irvine, T. F., Jr.; Hartnett, J. P. and Eckert, E. R. G.: **Solar collector surfaces with wavelength selective radiation characteristics,** p. 12–16
Jenness, James R., Jr.: **The effect of surface coatings on the solar radiation equilibrium skin temperature of an earth satellite,** p. 17–20
Shaffer, L. H.: **Wavelength-dependent (selective) processes for the utilization of solar energy,** p. 21–46
Tabor, H.: **Stationary mirror systems for solar collectors,** p. 27–33
Ward, G. T.: **Evidence for the need of a cheap simple solar radiation recorder,** p. 34–36
Baum, V. A. and Strong, J. D.: **Basic optical considerations in the choice of a design for a solar furnace,** p. 37–45
Allison, Fred and Hughes, Gordon: **Suggested methods of aligning the planes of the solar furnace heliostat mirrors into parallelism,** p. 46–48
Hughes, Gordon: **A solar furnace using a horizontal heliostat array,** p. 49–51

South Africa. Weather Bureau, Notos, Vol. 6, No. 3/4, 1957

Schumann, T. E. W.: **The graduation or smoothing of data in one and two dimensions,** p. 114–11
Nagel, J. F.: **Unusual radiosonde sounding at Pretoria on September 14, 1957,** p. 120–122
Hofmeyr, W. L.: **An analysis of upper wind over the southern ocean in summer,** p. 123–126
Burdecki, F.: **In memoriam: Henryk Arctowski,** p. 126–127

Tellus, Stockholm, Vol. 11, No. 1, Feb. 1959

Dufour, L.: **Sur le taux de variation adiabatique de la température en fonction de la pressio dans une masse d'air contenant un cristal de glace sphérique,** [The rate of adiabati variation of temperature as a function of the pressure in an air mass containing a spherica ice crystal], p. 1–3
Haltiner, G. J.: **On the theory of convective currents,** p. 4–15
Mordy, W. A.: **Computations of the growth by condensation of a population of cloud droplets,** p. 16–44
Wiin-Nielsen, Aksel: **On certain integral constraints for the time-integration of baroclini models,** p. 45–59
Fischer, Günter: **Ein numerisches Verfahren zur Errechnung von Windstau und Gezeiten i Randmeeren,** [A numerical method of calculating surge and tides in bordering seas] p. 60–76
Fonselius, Stig and Östlund, Göte: **Natural radiocarbon measurements on surface water fro the North Atlantic and the Arctic Sea,** p. 77–82
Lockhart, L. B., Jr.; Baus, R. A. and Blifford, I. H., Jr.: **Fission product radioactivity in th air along the 80th meridian, January–June 1957,** p. 83–90

Goel, P. S.; Narasappaya, N.; Prabhakara, C.; Thor, Rama and Zutshi, P. K.: **Study of cosmic ray produced short-lived P^{32}, P^{33}, Be^{7}, and S^{35} in tropical latitudes,** p. 91–100
Johansson, Sven A. E.: **On the influence of cosmic radiation on the isotopic composition of the elements,** p. 101–105
Alfvén, H.: **Momentum spectrum of cosmic radiation,** p. 106–115
Venkatesan, D. and Dattner, A.: **Long term changes in the daily variation of cosmic ray intensity,** p. 116–129
Nishimura, Eiichi; Kishimoto, Yoshimichi and Tanaka, Yutaka: **Observed secular tilting motion of the ground which preceded the occurrence of several destructive earthquakes,** p. 130–134
Starr, Victor P.: **Hydrodynamical analogy to $E=mc^2$,** p. 135–138
Current data on the chemical composition of air and precipitation, Pt. 16, p. 139–145
CO_2-values in Scandinavia Aug.–Sept. 1958, p. 145–146

Vsesoiuznoe Astronomo-Geodezicheskoe Obshchestvo, Moscow, Biulleten', No. 19(26), 1956

Grishin, N. I.: **Issledovanie nepreryvnogo spektra serebristykh oblakov,** [Investigation of the continuous spectrum of noctilucent clouds], p. 3–16
Chistiakov, V. F. and Teĭfel', V. G.: **Nekotorye voprosy prirody serebristykh oblakov,** [Some problems concerning the nature of noctilucent clouds], p. 17–30
Chernov, V. M. and Chistiakov, V. F.: **Galosy i obshchaia tsirkuliatsiia atmosfery,** [Halos and general atmospheric circulation], p. 31–35
Astavin-Razumin, D. L.: **Dva meteornykh spektra Perseid 1953 g.,** [Two Perseid meteoric spectra in 1953], p. 36–39
Simakina, E. G.: **Obrabotka fotografii meteora 8 avgusta 1950 g.,** [Analysis of a meteor photograph of Aug. 8, 1950], p. 40–45
Rozenblium, N. D.: **Priblizhennyĭ metod opredeleniia vysot meteorov iz odnostoronnikh fotograficheskikh nabliudeniĭ,** [Approximate method of meteor height determination from single-point photographs], p. 46–53
Zotkin, I. T.: **Nekotorye zamechaniia o metode obrabotki odnostoronnikh fotografiĭ meteorov,** [Comments on a method of single-point meteor photograph analysis], p. 54–61
Abramson, I. K.: **Obrabotka odnostoronneĭ fotografii meteora 21/22 aprelia 1949 g.,** [Analysis of a single-point meteor photograph of April 21/22, 1949], p. 62–63
Fedynskiĭ, V. V.: **K voprosu o primenenii odnostoronnego metoda fotografirovaniia meteorov,** [On the usefulness of the single-point method of meteor photography], p. 64–65

No. 23(30), 1958

Kartashev, V. P.; Lileev, M. V.; Skul'skiĭ, V. Iu. and Shukstova, Z. N.: **O nabliudenii polnogo solnechnogo zatmeniia 30 iuniia 1954 g. Sverdlovskoĭ ekspeditsieĭ,** [Observation of the total solar eclipse of June 30, 1954 by the Sverdlovsk expedition], p. 3–17
Nabokov, M. E.: **Pribor dlia izmereniia bleska solntsa vo vremia zatmeniia,** [Instrument for measuring the sun's brightness during eclipses], p. 18–20
Sokolova, N. I.: **Nabliudeniia bleska solntsa vo vremiia solnechnogo zatmeniia 30 iuniia 1954 g.,** [Observation of the sun's brightness during the solar eclipse of June 30, 1954], p. 21–23
Simakina, E. G.: **Fotografiia meteora 6–7 dekabria 1950 g.,** [Photograph of the meteor of Dec. 6–7, 1950], p. 57–58
Simakina, E. G.: **Vysota odnogo Perseida,** [Height of a Perseid], p. 59–60
Bakharev, A. M.: **Polozhenie osi utrenneĭ i vecherneĭ sostavliaiushchikh zodiakal'nogo sveta po nabliudeniiam za 23 goda,** [Position of the axes of the morning and evening components of zodiacal light according to 23 years of observation], p. 61–65

Weather, London, Vol. 14, No. 5, May 1959

Jackson, Allan A.: **The eco-climatology of Dutch Lights, Pt. 2,** p. 155–162
Sutcliffe, R. C.: **The future of weather forecasting,** p. 163–169
Field study courses in meteorology, p. 169
Khromov, S. P.: **'Table-cloth' of Table Mountain** [photo], p. 170
Booth, R. E.: **Looking back on 1958,** p. 171–175
Agrometeorology in the New World, p. 175–176
Ludlam, F. H.: **Thunderstorm studies, 1959—a call for voluntary observers,** p. 177–180

Weatherwise, Boston, Vol. 12, No. 2, April 1959

Brancato, G. N.: **St. Louis tornado February 10, 1959,** p. 43–44
Treidl, R. A.: **The great midwinter storm of January 20–22, 1959,** p. 45–47
Joos, Lothar A.: **The midwinter storm in Illinois,** p. 47–48
Quiroz, Roderick S.: **Record snowfall in sunny southern Arizona,** p. 49–50
Oswego snowburst, p. 51
O'Connor, James F.: **1958—the warmest year of record on the Pacific Coast,** p. 52–55; 61
Hevener, Osborn Fort: **All about humiture,** p. 56; 83–85
Thom, Earl C.: **The discomfort index,** p. 57–60
Brunk, Ivan W.: **Another blizzard of 1888,** p. 62–63
Bundgaard, Robert C.; Fletcher, Robert D. and Smith, James R.: **Typhoon-eye cloud patterns as viewed from above,** p. 64–66
Fritz, Sigmund et al.: **IGY special studies in meteorology,** p. 67–72
Rigby, Malcolm: **Popular and technical books on meteorology, 1957–58,** p. 73–75
Hennessey, Louis J.: **He tries to do something about it,** p. 76–77

World Meteorological Organization, WMO Bulletin, Vol. 8, No. 2, April 1959

Third World Meteorological Congress: a review of the main questions to be discussed, p. 52–58
WMO membership now 100, p. 58–59
Ashford, O. M.: **International Geophysical Year,** p. 60–61
Van Mieghem, J.: **Antarctic meteorology,** p. 61–67
Veranneman, N. L.: **Seminar in Rome [on] synoptic meteorology in the Mediterranean,** p. 68–73
Sanuki, M.: **Japanese automatic wind station,** p. 73–74
Langlo, K.: **Meteorology in the Antarctic: discussions in Australia,** p. 75–77
Rivet, J. R.: **Second Session of Regional Association IV,** p. 77–80
Primault, B.: **The measurement of soil temperature,** p. 88–93
Rogers, P.: **Comparisons of evaporation pans,** p. 95–98

PART IV. AUTHOR AND SUBJECT INDEXES

In this section will be found reference to the number given at the head of each abstract or entry. In Part I each entry begins with the number 10.6, and in Part II in the Bibliography on Ozone each entry begins with the number and letter 10F. This index is divided into three parts:

Index of Authors | Index of Subjects | Index of Geographic Locations

INDEX OF AUTHORS

Abel, G. C., 10.6–6
Adams, W. S., 10.6–55
Adel, A., 10F–30, 10F–48, 10F–55, 10F–56, 10F–57, 10F–58, 10F–131
Adey, A. W., 10.6–220
Adler, I., 10.6–21
Aggarwal, M. L. (*ed.*), 10.6–280
Agy, V., 10.6–169
Ainsworth, J., 10.6–39
Air Pollution Foundation, Los Angeles, 10F–52
Akademiia Nauk SSSR. Energeticheskiĭ Institut, 10.6–1
Akademiia Nauk SSSR. Institut Okeanologii, 10.6–2
Akademiia Nauk SSSR. Komissa po Issledovaniiu Solntsa, 10.6–3
Alaska. Univ. Geophysical Institute, 10F–119
Alekseev, P. P., 10.6–87
Al-Shalash, A. H., 10.6–287
Altshuller, A. P., 10F–132
American Petroleum Institutes, 10F–52
Andrianov, M. S., 10.6–297
Anido Artiles, A., 10.6–178
Antal, E., 10.6–179
Appleton, Sir E., 10.6–170
Arakawa, A., 10.6–182
Arizona. State College, 10F–30, 10F–58
Arizona. State College, Flagstaff, 10F–131
Armour, D. G., 10.6–190
Atkinson, B. M., 10.6–258
Aubert de la Rue, E., 10.6–22
Aurand, K., 10.6–116

Baer, L., 10.6–192
Bagariatskiĭ, B. A., 10.6–202
Bagg, T. C., 10F–22
Bailey, V. A., 10.6–171
Balek, J., 10.6–278
Ballenzweig, E. M., 10.6–191
Banerji, R. B., 10.6–236
Barrett, R. B., 10.6–113
Barth, C. A., 10.6–203
Bass, D. E., 10.6–301
Bates, D. R. (ed.), 10.6–4
Bates, M. (rev.), 10.6–22
Battan, L. J., 10.6–156, 10.6–157
Baum, V. E., 10.6–1
Baumgartner, A., 10.6–295
Beatty, J. R., 10F–1
Beer, A. (ed.), 10.6–55, 10.6–170
Belgium. Observatoire Royal, 10F–107
Bendinger, J. F., 10.6–200
Bensink, J., 10.6–100
Berg, O. E., 10.6–88
Berkner, L. V., 10.6–44
Berlin. Freie Universität. Institute für Meteorologie und Geophysik, 10.6–151
Bezverkhniĭ, Sh. A., 10F–2, 10F–27, 10F–49
Bhalotra, Y. P. R., 10.6–232
Bhan, S. N., 10.6–260
Bhatia, S. S., 10.6–279
Bhatt, U. J., 10.6–115
Bialecke, E. P., 10.6–168
Bigg, F. J., 10.6–6
Birkeland, J. W., 10F–123
Bissell, M. H., 10.6–288
Biswas, K. R., 10.6–254
Blagonravov, A. A., 10.6–89
Blanchard, D. C., 10.6–252
Bohan, W., 10.6–185
Bol'shakov, V. S., 10.6–225
Bourliere, F., 10.6–22
Boyd, D. W., 10.6–109
Boud, R. L. F., 10.6–84, 10F–8, 10F–20, 10F–161
Braham, R. R., Jr., 10.6–312
Brewer, A. W., 10F–51, 10F–91
Britaev, A. S., 10F–168
Brooks, C. F., 10.6–63
Brooks, D. L., 10F–133
Brown, E. N., 10.6–142
Bruce, J. P., 10.6–266
Brun, E. A. (ed.), 10.6–6
Brun, R. J., 10.6–140
Brunelle, B. M., 10F–137
Buckler, S. J., 10F–62
Buell, C. E., 10.6–152
Bürger, K., 10.6–13
Burch, D. E., 10F–50, 10F–123
Burdo, O. A., 10.6–82
Buskirk, E. R., 10.6–301
Butorin, M. M., 10.6–153
Byers, H. R., 10.6–243

Cagniard, L., 10.6–69
Cain, A. B., 10F–28
Cain, J. C., 10F–28
California. Univ. Scripps Institution of Oceanography, La Jolla, 10.6–5
Campbell, J. H., 10.6–25
Canada. Meteorological Branch, 10.6–33
Cartwright, D. E., 10.6–67
Chalonge, D., 10F–29, 10F–51
Chapman, S., 10.6–34
Charnock, H., 10.6–235
Chen, L. S., 10.6–187
Chernov, V. M., 10.6–317
Chew, F., 10.6–68
Chicago. Univ. Dept. of Meteorology, 10.6–156, 10.6–157, 10.6–312
Chistiakov, V. F., 10.6–317
Chorley, R. J., 10.6–285
Christie, E. J., 10.6–24
Clark, R. H., 10.6–283
Clouds (filmstrip), 10.6–27
Cloudsley-Thompson, J. L., 10.6–292
Conference on Chemical Reactions in Urban Atmospheres, Univ. of Calif. at L. A., Feb. 2–3, 1956, 10F–52
Conklin, G., 10.6–29
Contract AF 19(122)-198, 10F–30, 10F–58
Contract AF 19(122)-381, 10F–19

Contract AF 19(604)-753, 10.6–145
Contract AF 19(604)-1000, 10.6–174, 10F–77
Contract AF 19(604)-1003, 10F–78, 10F–86
Contract AF 19(604)-1141, 10.6–38
Contract AF 19(604)-1388, 10.6–156, 10.6–157
Contract AF 19(604)-1738, 10F–97
Contract AF 19(604)-1817, 10F–119
Contract AF 19(604)-1931, 10.6–312
Contract AF 19(604)-1950, 10F–109
Contract AF 19(604)-2166, 10F–157
Contract AF 19(604)-2177, 10F–131
Contract AF 61(514)-432, 10F–107
Contract AF 61(514)-640, 10.6–318, 10.6–321, 10F–100
Contract AF 61(514)-905, 10F–93
Contract AF 61(514)-946, 10.6–151
Contract Cwb-8810, 10F–116
Contract Cwb-9281, 10.6–72
Contract Nonr-1684 (00), 10.6–160
Cooley, D. S., 10.6–155
Cooper, C. D., 10.6–200
Couder, A., 10.6–293
Coulomb, J., 10.6–80
Craig, G. S., 10.6–52
Craig, H. (ed.), 10.6–5
Craig, R. A., 10F–134
Croft, J. F., 10.6–241
Cullen, R. E., 10.6–6
Cummins, H. Z., 10F–86
Curtis, H. O., 10.6–95

Dąbrowski, A., 10.6–81
Dalgarno, A., 10.6–172
Dao, Shih-Yen, 10.6–187
Dave, J. V., 10F–115, 10F–166
David, M. A., 10.6–58
Davidson, B., 10F–117
Davies, T. V., 10.6–189
Day, J. A., 10.6–253
Derby, R. C., 10.6–155
Dmitriev, A. A., 10.6–228
Dobson, G. M. B., 10F–51, 10F–92
Dolezalek, H., 10.6–318, 10.6–321
Donehoo, I., 10.6–297
Doraiswamy Iyer, V., 10.6–208
Dougal, H. A., 10.6–168
Douglas, A. E., 10F–53
Douglas, M. S., 10.6–23
Downie, C. S., 10.6–93
Dütsch, H. U., 10F–51, 10F–54, 10F–93
Duncan, R. A., 10.6–173
Dvoskin, N., 10.6–229

Ehmert, A., 10F–20, 10F–135
Einstein, A., 10.6–25
Eldridge, R. G., 10.6–309
Elvey, C. T., 10.6–327
Endow, N., 10F–73
Endresen, K., 10.6–308
Epstein, E. S., 10F–30, 10F–48, 10F–55, 10F–56, 10F–57, 10F–58
Eriksson, B. E., 10.6–75
Eriksson, E., 10.6–300
Eye, M. G., 10F–75

Fan, C. Y., 10.6–325
Farkas, E., 10F–3
Farlow, N. H., 10.6–247
Faucher, G. A., 10.6–95
Fea, G., 10.6–121
Fel'dman, Ia. I., 10.6–268
Ferdon, E. N., Jr., 10.6–288
Finger, F. G., 10F–149
Fisher, J., 10.6–57
Fisher, M., 10.6–57
Fleagle, R. G., 10.6–240
Fleming, J. A., 10.6–59
Flohn, H., 10.6–224
Florida. State Univ. Dept. of Meteorology, 10.6–145
Fluker, B. J., 10.6–212
Ford, H. W., 10F–73
Ford, N. D., 10.6–28
Ford Motor Co. Aeronutronics Systems, Inc., Glendale, Calif., 10F–157
Forrester, F. H., 10.6–24
Forsdyke, A. G., 10.6–189
Fournier d'Albe, E. M., 10F–51, 10F–59
Fox, M. M., 10F–6, 10F–64
Fraser, D., 10.6–6
Freeman, J. C., Jr., 10.6–192
Frenkiel, F. N., 10F–31
Fujiwara, M., 10.6–275
Fultz, D., 10.6–185

Ganesan, V., 10.6–267
Gangopadhyaya, M., 10.6–221
Gazzola, A., 10.6–121
Geiger, P. P., 10.6–298
Georgi, J., 10.6–48
Germany. Deutsche Demokratische Republik, 10.6–133, 10F–32
Germany. Deutscher Wetterdienst (Meteorological Observatory, Aachen), 10.6–318, 10.6–321, 10F–100
Giordano, A., 106.–304
Gleeson, T. A., 10.6–145
Goldberg, L., 10F–4
Goldstein, L., 10.6–171
Goodman, J., 10.6–123
Goody, R. M., 10F–5, 10F–25, 10F–60, 10F–61, 10F–89, 10F–136
Gora, E. K., 10F–154
Gorodinskiĭ, S. M., 10F–33
Goto, T., 10.6–274
Gowan, E. H., 10F–51, 10F–62
Graystone, P., 10.6–20
Gringorten, I. I., 10.6–146
Grunow, J., 10.6–143
Gushchin, G. P., 10F–94, 10F–95, 10F–96

Haagen-Smit, A. J., 10F–6, 10F–63, 10F–64, 10F–137
Hagfors, T., 10.6–308
Haig, T. O., 10.6–310
Haltiner, G. J., 10.6–180
Hamming, W. J., 10F–75
Hapgood, C. H., 10.6–25
Harang, L., 10.6–326
Harrington, E. L., 10.6–256, 10.6–312
Harrow, J. P., 10.6–22
Haurwitz, B., 10F–97
Hearn, A. G., 10F–98
Heddon, M. W., 10F–75
Heggestad, H. E., 10F–155
Héjjas, A., 10F–65
Hendrickson, E. R., 10.6–162
Hendrix, W. P., 10.6–249
Henry, R. M., 10.6–186
Herzberg, G., 10F–53
Hess, S. L., 10.6–186
Higgs, R. L., 10.6–193
Hill, K. E., 10.6–52
Hille, A., 10.6–60
Hincks, E. P. (rev.), 10.6–7
Hodinková, Z., 10.6–132
Höiland, E., 10.6–219
Horiuchi, G., 10F–66, 10F–99, 10F–138
Horowitz, R., 10.6–39
Horwood, J. H., 10F–156
Hubert, L. F., 10.6–150
Hurd, F. K., 10.6–249
Huzimura, I., 10.6–218

Iastrebov, E. V., 10.6–227
Ikeda, H., 10F–159
Imakado, M., 10.6–226
Inagaki, T., 10.6–265
India. Central Board of Irrigation and Power, 10.6–280
Institution of Engineers, Australia, 10.6–15
Institution of Heating and Ventilating Engineers, London, 10.6–110

International Civil Aviation Organization, 10.6–96
International Union of Geodesy and Geophysics, 10F–34, 10F–51
Iozenas, V. A., 10F–168
Ishiguro, S., 10.6–70
Ismailova, A. A., 10.6–112
Israël, H., 10F–100

Japan. Meteorological Agency, Tokyo, 10F–101, 10F–139
Jelley, J. V., 10.6–7
Jerlov, N. G., 10.6–71
Johansen, H., 10F–35, 10F–140
Johnson, F. S., 10F–7, 10F–8
Johnson, J. C., 10.6–309
Johnston, H., 10.6–8
Johnston, R. G., 10F–22
Journal of Scientific and Industrial Research, 10.6–32, 10.6–50
Jung, G. H., 10.6–192
Junge, C. E., 10.6–272, 10F–108, 10F–141
Just, D., 10.6–151
Juve, A. E., 10F–1

Kajiura, K., 10.6–72
Kamiyama, H., 10.6–166, 10.6–320
Kano, M., 10F–163
Kao, Yu-hsie, 10.6–269
Kaplan, L. D., 10F–67
Karapiperis, P. P., 10.6–56
Kassander, A. R., 10.6–157
Kats, A. L., 10.6–11
Kawamura, K., 10F–13, 10F–51, 10F–68, 10F–102
Kay, R. H., 10F–9, 10F–51
Kaylor, R., 10.6–185
Keller, G., 10.6–313
Kendrew, W. G., 10.6–9
Khalek, A., 10F–10, 10F–51
Khrgian, A. Kh., 10F–142
Khvostikov, I. A., 10F–69
Kikuchi, T., 10.6–222
Kinoshita, M., 10.6–148
Kobus, G. L., 10.6–45
Kolobkov, N. V., 10.6–46
Koloskov, P. I., 10.6–61
Kocyan, I., 10.6–307
Komlev, A. M., 10.6–35
Kondrat'ev, K. Ia., 10F–70
Kontorshchikov, A. S., 10.6–101
Koo, Ch-C., 10.6–184
Kosarev, M. V., 10.6–276
Kotsev, V., 10.6–319
Krammer, H., 10.6–117
Krauss, J., 10.6–10
Kresge, R. F., 10.6–144
Krichak, O. G., 10.6–40
Kritskiĭ, S. N., 10.6–281
Kryndin, A. N., 10.6–78
Kubo, J., 10.6–209
Kubyshkin, G. P., 10.6–282
Küley, M., 10.6–118
Kuiper, G. P., (ed.), 10F–4
Kulcke, W., 10F–103
Kurbatkin, G. P., 10.6–147
Kussman, A. S., 10.6–154
Kutoboi, A. M., 10.6–103
Kuznetsov, A. P., 10F–104, 10F–168
Kuznetsova, L. P., 10.6–105

LaGow, H. E., 10.6–39
Lamb, H. H. (rev.), 10.6–9
Landauer, J. K., 10.6–76
Landmark, B., 10.6–308
Landsberg, H. E., 10.6–102
Langlo, K., 10F–71
Langway, C. C., Jr., 10.6–77
Lappo, T. I., 10.6–213
Larsen, S. H. H., 10F–36
Lawrence, E. N., 10.6–206
Leak, W. M., 10F–11
Leavitt, J. M., 10.6–163
Lebrun, A., 10.6–305
Leighton, P. A., 10F–143
Leroy, B., 10F–81
Lettau, H. H. (ed.), 10F–117
Levert, C., 10.6–41
Liège. Université. Institut d'Astrophysique, 10F–107
Link, F., 10F–72
Lisitzin, E., 10.6–79
Little, A. D., Inc., 10.6–160
Littman, F. E., 10F–73, 10F–74
Loewe, F., 10.6–36
London, J., 10F–97
Long, R. R., 10.6–185
Longley, R. W., 10.6–37
Lowenthal, M. J., 10.6–19
Ludlam, F. H., 10.6–26, 10.6–27
Ludlum, D. M., 10.6–128
Lydolph, P. E., 10.6–64

Ma, Ting-Ying H., 10.6–290
McCubbin, T. K., Jr., 10.6–198
McDonagh, J. E. R., 10.6–119
MacDonald, N. J., 10.6–94
McGill Univ. Arctic Meteorology Research Group, 10.6–38
McKeown, H. D. J., 10.6–164
McLeod, J. D., 10.6–283
McLintock, T. F., 10.6–106
Mader, P. P., 10F–75
Mäde, A., 10.6–130
Mahmoudian, M. B., 10F–105
Majewski, A., 10.6–194
Major, G., 10.6–42
Makerov, Iu. V., 10.6–12
Malinovski, A., 10.6–124
Malkina, A. D., 10.6–248
Malurkar, S. L., 10F–12, 10F–76
Manring, E. R., 10.6–200
Marik, R. H., 10.6–197
Marine Observer, 10.6–314, 10.6–323
Martin, C. D., 10F–106
Martin, D. W., 10F–51, 10F–77
Marynowski, C. W., 10F–74
Masalova, S. P., 10.6–181
Massachusetts Institute of Technology. Dept. of Meteorology, 10.6–174, 10F–77
Massey, H. S. W., 10.6–84, 10.6–85, 10F–8, 10F–20, 10F–161
May, F. G., 10.6–165
Mazin, I. P., 10.6–97
Meinel, A. B., 10.6–204
Meldau, H., 10.6–10
Menkel', M. F., 10.6–281
Meredith, L. H., 10.6–88
Mertsalov, A. N., 10.6–122
Middleton, H. K. (ed.), 10.6–62
Middleton, J. T., 10F–155
Migeotte, M. V., 10F–67, 10F–107
Mikhaĭlov, A. N., 10.6–49
Miller, L. E., 10F–108
Miyake, Y., 10F–13, 10F–51
Momin, A. U., 10F–14
Montalto, M., 10.6–121
Moore, C. B., 10.6–160
Moroz, A. A., 10.6–103
Morrison, R. B., 10.6–6
Morton, W. O., III, 10.6–310
Mühleisen, R., 10.6–324
Müller-Hillebrand, D., 10.6–322
Munk, W., 10.6–73
Munn, R. E., 10.6–234
Murai, K., 10F–163
Murcray, W., 10F–119
Murgatroyd, R. J., 10.6–237

Narasimhan, S., 10.6–244
National Science Foundation, 10F–52
Naturwissenschaftliche Rundschau, Stuttgart, 10F–153
Naval Aviation News, 10.6–158
Netherlands. Meteorologisch Instituut, 10.6–129, 10.6–131
Neven, L., 10F–67, 10F–107
New Mexico. Univ. Dept. of Physics, 10F–19, 10F–109, 10F–116
N. Y. Univ. College of Engineering, Research Div. Dept. of Meteorology and Oceanography, 10F–97

New Zealand. Soil Conservation and Rivers Control Council, 10.6–16
Nexsen, W. E., Jr., 10F–78
Neyama, Y., 10.6–167
Nicholls, J. A., 10.6–6
Nicolet, M., 10F–51
Noguchi, M., 10.6–270
Normand, Sir C., 10F–15, 10F–51
Norske Institutt for Kosmisk Fysikk, 10F–16
North Atlantic Treaty Organization, 10.6–6

Öpik, E. J., 10.6–86
Ogiński, A., 10.6–307
Ogura, Y., 10.6–177, 10.6–195
Ohio. State Univ. Research Foundation, 10F–78, 10F–86
Ohring, G., 10F–134
Okabayashi, T., 10F–110
Oliver, J., 10.6–311
Ordway, F. I., III, 10.6–92
Orr, C., 10.6–249
Osherovich, A. L., 10F–49
Osterberg, C., 10F–30, 10F–55, 10F–56
Owens, G. V., 10.6–185

Paetzold, H.-K., 10F–17, 10F–20, 10F–37, 10F–38, 10F–39, 10F–51, 10F–56, 10F–103, 10F–111, 10F–112, 10F–113, 10F–114, 10F–162
Pashinskiĭ, Ia., 10.6–47
Paszyński, J., 10.6–286
Péczely, G., 10.6–264
Pejml, K., 10.6–291
Perkins, W. A., 10F–143
Pettit, K. G., 10.6–6
Phillips, B. B., 10.6–251
Piccardi, G., 10.6–302, 10.6–303
Pimentel, D., 10.6–296
Pinus, N. Z., 10.6–98
Plass, G. N., 10F–157
Pogosian, Kh. P., 10.6–188
Pokrovskiĭ, V. N., 10F–79
Pooler, F., Jr., 10.6–163
Pressly, E. C., 10.6–90
Pressman, J., 10F–18, 10F–40, 10F–41
Purcell, J. D., 10F–8

Rajkay, O., 10.6–60
Ramanathan, K. R., 10F–80, 10F–115
Ramdas, L. A., 10.6–244
Rank, D. H., 10.6–198
Rao, B. S., 10.6–245
Rasool, I., 10F–59, 10F–81, 10F–82, 10F–83, 10F–84
Ratner, B., 10.6–18
Regener, E., 10F–20, 10F–112
Regener, V. H., 10F–19, 10F–51, 10F–116, 10F–117, 10F–118
Rendd, D. G. A., 10.6–6
Renzetti, N., 10F–42, 10F–85
Reynolds, R. R., 10.6–161
Riehl, H., 10.6–238
Roach, W. T., 10.6–201, 10F–60, 10F–136
Roberts, B. B., 10.6–57
Robin, A. G., 10.6–107
Rodionov, S. F., 10F–49
Rödsrud, J., 10.6–308
Rogers, L. H. (*ed.*), 10F–52
Roldan Seminario, E., 10.6–65, 10.6–306
Romanovsky, J. C., 10F–85
Romick, G. J., 10.6–327
Romick G., 10F–119
Rose, D. C., 10F–53
Rossi, V., 10.6–137
Rougetet, E., 10.6–231
Roy, A. K., 10.6–273

Sakai, I., 10F–160
Saksena, G. D., 10.6–198
Sal'man, E. M., 10.6–125
Saltzman, B., 10.6–174
Sánchez Carillo, J. M., 10.6–289
Sato, T., 10.6–199, 10.6–320
Scarlott, C. A., 10.6–108
Schaffer, W., 10.6–216
Schmuck, A., 10.6–246
Schöttner, K., 10F–120
Schoner, R. W., 10.6–17
Science News Letter, 10F–43
Scorer, R. S., 10.6–26, 10.6–27, 10.6–189, 10.6–242, 10.6–255
Scott, W. E., 10.6–59
Seaton, M. J. (ed.), 10F–20
Seaver, F. A., 10.6–155
Sekera, Z., 10F–166
Sekihara, K., 10.6–315, 10F–21, 10F–163
Seydl, O., 10.6–58
Shackleton, E. H., 10.6–57
Shapiro, R., 10.6–217
Sharp, F. H., 10.6–99
Shaw, J. H., 10F–86, 10F–123
Sherrod, J., 10.6–66
Shigolev, A. A., 10.6–104
Shimizu, M., 10F–138, 10F–144, 10F–158
Shipchinskiĭ, A. V., 10.6–53
Shishkin, N. S., 10.6–257, 10.6–277
Shmeter, S. M., 10.6–134
Shul'gin, A. M., 10.6–61
Shur, G. N., 10.6–136
Singer, S. F., 10.6–91, 10F–167
Sinha, K. L., 10.6–135, 10.6–261
Sirotkin, Ia. A., 10.6–175
Sivall, T., 10.6–233
Skliarov, V. M., 10.6–54
Slater, A. E., 10F–87
Slaucitajs, L., 10.6–83
Smalley, C. L., 10.6–223
Smith, C. P., 10.6–114
Smith, J. W., 10.6–127
Smith, M. E., 10.6–210
Smith, R. B., 10.6–93
Smith, W. H., 10.6–111
Sneyers, R., 10.6–120
Snodgrass, F. E., 10.6–73, 10.6–74
Sokolov, A. A., 10.6–284
Somov, M. M., 10.6–43
Sonntag, D., 10.6–139
Spinnangr, F., 10.6–262
Sreeramulu, T., 10.6–294
Srinivasan, P. K., 10.6–211
Srivastava, R. C., 10.6–254, 10.6–273
Stair, R., 10F–22
Stakutis, V. J., 10.6–316
Stokinger, H. E., 10F–145
Stubbs, H. E., 10.6–6
Sugimoto, Y., 10.6–239
Suprunenko, P., 10.6–159
Svensson, B., 10F–146
Swensson, J., 10F–107

Takahashi, T., 10.6–214
Tamutis, P. K., 10F–164
Tanaevsky, O., 10F–121
Tancreto, A. E., 10.6–196
Tateno, Japan. Aerological Observatory, 10F–122, 10F–147, 10F–148
Taylor, J. H., 10F–123
Teichert, F., 10F–44, 10F–45, 10F–88
Teweles, S., 10F–149
Texas. Agricultural and Mechanical College, Dept. of Oceanography and Meteorology, 10.6–72
Thomas, M. K., 10.6–109
Thompson, C. E., 10F–62
Thompson, J. K., 10.6–6
Thorp, C. E., 10F–46
Toolin, R. B., 10.6–316
Tousey, R., 10F–8
Tow, P. S., 10F–124
Tricker, M. J., 10.6–73
Tromsö, Norway, Nordlys-Observatoriet, 10F–16
Tsuchiya, I., 10.6–271

Uemura, H., 10.6–263
Undt, W., 10.6–51
U. S. Army Snow Ice and Permafrost Research Establishment, 10.6–76

U. S. National Bureau of Standards, 10.6–62
U. S. Naval Research Laboratory, 10.6–11
U. S. Weather Bureau, 10.6–30, 10.6–31

Vallejo, E. S., 10.6–306
Valníček, B., 10F–47
Valovicin, F., 10F–97
Vander Elst, N., 10.6–305
Vangengeim, G. Ia., 10.6–14
Van Straten, Florence W., 10.6–158
Vasil'chenko, I. V., 10.6–176
Vassy, A., 10F–23, 10F–51, 10F–81, 10F–84, 10F–121, 10F–125, 10F–150, 10F–151, 10F–152
Vassy, E., 10F–8
Venkateswara Rao, D.. 10.6–197
Vernet, A., 10.6–299
Vigroux, E., 10F–24, 10F–107, 10F–126
Visser, S. W., 10.6–207
Vitvitskiĭ, G. N., 10.6–183
Vogt, D. E., 10.6–140
von Arx, W. S., 10.6–141
Vonnegut, B., 10.6–160, 10.6–258

Wagner, N. K., 10.6–230
Walden, H., 10.6–205
Walshaw, C. D., 10F–5, 10F–25, 10F–61, 10F–89, 10F–98, 10F–127
Walton, G. F., 10F–128, 10F–129, 10F–130
Wanta, R. C., 10.6–163
Warmbt, W., 10F–44, 10F–88
Weil, J., 10.6–185
Weiss, A. A., 10.6–126, 10.6–127
Wentworth, R. E., 10F–167
Werby, R. T., 10.6–272
White, F. W. G., 10.6–250
White, R. M., 10.6–155
Wiecha, D., 10.6–307
Wilkins, E. M., 10.6–149
Wilkins, E. W. C., 10F–165
Williams, D. T., 10.6–215
Wilson, G. U., 10.6–107
Wordie, J. M., 10.6–57
Wormell, T. W., 10F–90, 10F–98
Wulf, O. R., 10F–26

Yajima, Y., 10.6–138
Yamada, N., 10.6–259
Yamasaki, M., 10F–110, 10F–144, 10F–158, 10F–159, 10F–160
Yates, H. W., 10F–123
Yates, R. A., 10.6–10
Yeh, Tu-Chen, 10.6–184

Zbiegień, J., 10.6–307
Zimmerman, J. E., 10F–26
Zschörner, H., 10F–37, 10F–39, 10F–114

INDEX OF SUBJECTS

AIREP reports, 10.6–96
Abnormal spring, U. S. (1957), 10.6–128
Absorption spectra, 10F–4
Advection free days, 10.6–179
Aerobee observations, 10.6–39
Aerobee rockets, 10.6–90
Aerological measurements, 10F–101
Aeronautical meteorology, 10.6–50, 10.6–60
Aeronautical meteorology codes, 10.6–96
Aeronautical meteorology textbooks, 10.6–8
Agricultural meteorology, 10.6–102
Agrometeorological indexes, 10.6–104
Agrometeorological research, 10.6–101
Agrometeorological stations, 10.6–103
Air-borne instruments, 10.6–141
Air-borne spectrograph, 10F–158
Air conditioning calculations, 10.6–110
Air flow over mountains, 10.6–184, 10.6–242
Air mass transformation, 10.6–175
Air pollution conferences, 10F–52
Air route climatology, 10.6–20
Air sampling and analysis, 10.6–163, 10F–137
Airplane rainfall measurement, 10.6–142
Airplane turbulence observation, 10.6–98, 10.6–136
Airport visibility, 10.6–93
Airways forecasting, 10.6–94
Altimeters, 10.6–153
Angle of arrival of meteor echoes, 10.6–308
Angular momentum transfer, 10.6–174
Annual hydrometeorological reports, 10.6–280
Annual marine meteorological data summaries, 10.6–129
Annual meteorological data summaries, 10.6–131
Annual ozone variations, 10F–68
Annual rainfall variations, 10.6–265
Annual temperature variations, 10.6–147
Annual upper air wind data reports, 10.6–133
Antarctic expeditions, 10.6–43, 10.6–57
Antarctic oceanography, 10.6–12
Apple storage, 10.6–111
Applied meteorology, 10.6–114
Approach Visibility Project 10.6–310
Architectural climatology, 10.6–29
Arctic jet stream, 10F–149
Arctic meteorology research, 10.6–38
Arctic upper atmosphere, 10.6–39
Arid zone ecology, 10.6–299
Arid zones, 10.6–243, 10.6–279, 10.6–300
Arthropeda microclimatology, 10.6–292
Artificial aerotherapy, 10.6–117
Artificial fog dissipation, 10.6–93
Associated Universities, Inc., 10.6–44
Astronomic meteorology, 10.6–313
Atmospheric circulation, 10.6–40, 10.6–183, 106.–184, 10F–80
Atmospheric composition, 10F–4, 10F–90, 10F–108, 10F–141
Atmospheric electricity, 10.6–324
Atmospheric electricity networks, 10.6–318
Atmospheric electricity of disturbed weather, 10.6–321
Atmospheric motion, 10.6–185

Atmospheric pollution, 10.6–162, 10F–33, 10F–42, 10F–43, 10F–132
Atmospheric pollution control studies, 10F–124
Atmospheric pollution measurement, 10F–85
Atmospheric pollution studies, 10.6–163
Atmospheric scattering, 10.6–198
Atmospheric transmission, 10.6–309, 10F–72
Aurora australis—Sept. 13, 1957, 10.6–127
Auroral-geomagnetic relationships, 10.6–325, 10.6–327
Auroral height distribution, 10.6–326
Auroral hydrogen lines, 10.6–325
Auroral intensity variations, 10.6–327
Auroral-magnetic relationships, 10.6–80
Auroral observations, 10F–16
Auroral spectra, 10.6–326

Balloon ascension rates, 10.6–135
Baric topography charts, 10.6–153
Bathystrophic flow, 10.6–192
Beetle microclimates, 10.6–297
B. F. Goodrich ozonometer, 10F–1
Biography of M. A. David, 10.6–58
Biography of Alfred Hille, 10.6–60
Biography of E. H. Shackleton, 10.6–57
Biography of P. I. Koloskov, 10.6–61
Biometeorological experiments, 10.6–303
Biometeorology, 10.6–297
Bismuth oxychloride precipitation, 10.6–302, 10.6–304
Body heat loss during exercise, 10.6–302
Bowen's theory, 10.6–250
Bubble electricity, 10.6–252

Canadian participation in IGY, 10.6–33
Carbon black, 10.6–158
Carbon dioxide absorption bands, 10F–107
Carbon dioxide in stratosphere, 10F–133
Ceiling data analysis, 10.6–259
Ceiling height forecasting, 10.6–259
Ceilometer instruction manuals, 10.6–30
Čerenkov radiation, 10.6–7
Chemical climatology of arid zones, 10.6–300
Chemical ozone determination, 10F–9, 10F–21
Chemical telemetering ozonesondes, 10F–116
Circulation types, 10.6–14
Climate, 10.6–65
Climate and morphometry, 10.6–285
Climate and vegetation, 10.6–299
Climate definitions, 10.6–65
Climate of Belgium, 10.6–120
Climate of Ecuador, 10.6–288
Climate of Hungary, 10.6–286
Climate of Iraq, 10.6–287
Climate of Turkey, 10.6–118
Climate of Ukraine, 10.6–297
Climate of U. S. cities, 10.6–28
Climate of Venezuela, 10.6–289
Climatic change theories, 10.6–25, 10.6–291
Climatic charts, 10.6–288
Climatic classifications, 10.6–299
Climatic data, 10.6–287
Climatic data for phenological periods, 10.6–130
Climatic effects on plastics, 10.6–113
Climatic probabilities, 10.6–149
Climatic zones, 10.6–298
Climatological research in Poland, 10.6–47
Climatology, 10.6–64
Climatology definitions, 10.6–64
Climatology research, 10.6–5
Climatology textbooks, 10.6–9
Climatotherapy, 10.6–51
Cloud drift preceding northwesters, 10.6–197
Cloud droplet impinger, 10.6–140
Cloud droplet size data, 10.6–251
Cloud film strips, 10.6–27
Cloud formation processes, 10.6–27
Cloud measuring instruments, 10.6–140
Cloud modification experiments, 10.6–160
Cloud modification with carbon black, 10.6–158
Cloud moving picture photography, 10.6–141, 10.6–258
Cloud particle sizes, 10.6–254
Cloud photographs, 10.6–26, 10.6–27, 10.6–255
Cloud physics, 10.6–26, 10.6–322
Cloud physics research, 10.6–250
Cloud refractive index, 10.6–312
Cloud seeding evaluation, 10.6–156, 10.6–157, 10.6–161
Cloud seeding in U.S.S.R., 10.6–159
Cloud seeding of orographic clouds, 10.6–156, 10.6–157
Cloud seeding techniques, 10.6–159
Cloud seeding with silver iodide, 10.6–156, 10.6–161
Cloud structure studies, 10.6–257
Coefficient of variation, 10.6–274
Cold front effects on ozone, 10F–151
Cold poles, 10.6–41
Condensation nuclei, 10.6–249, 10.6–324
Continental drift, 10.6–290
Convection above heated ground, 10.6–241
Convective cloud electrification, 10.6–160
Convective cloud structure, 10.6–273
Cosmic ray Čerenkov radiation, 10.6–7
Crouse-Hinds ceilometer, 10.6–30
Crustal shifts, 10.6–25
Cumulus cloud structure, 10.6–256
Cumulus clouds, 10.6–312

Dew measurement techniques, 10.6–48
Dew symposia, 10.6–48
Diffuse reflectance measurements, 10.6–309
Diffusion by fog, 10.6–309, 10.6–311
Dines anemograph, 10.6–139
Displacement sequence stereoscope, 10.6–141
Diurnal ozone variations, 10F–12, 10F–117
Diurnal pressure variations, 10.6–181
Diurnal rainfall variations, 10.6–250
Diurnal temperature fluctuations, 10.6–292
Diurnal temperature variations, 10.6–180, 10.6–181, 10F–40

Dobson spectrophotometer, 10F–28, 10F–82, 10F–93, 10F–122
Drought, Altai Region (1955), 10.6–268
Drought, Kazhakhstan (1955), 10.6–268
Drought analysis, 10.6–268
Dust, 10.6–21
Dust counting techniques, 10.6–164
Dust effects on terrestrial radiation, 10.6–164
Dynamic climatology of Arctic, 10.6–38
Dynamics of mammatus, 10.6–255
Dynamo current theory, 10.6–82

Earth's shadow, 10F–24, 10F–29
Eclipse effects on flocculations, 10.6–307
Economics of forecasts, 10.6–149
Edge waves, 10.6–73, 10.6–74
Effective temperatures, 10.6–104
Electrical charges on droplets from bursting bubbles, 10.6–252
Electrical charges on drops, 10.6–251
Electron concentration, 10.6–320
Electronic computer analysis of ozone distribution, 10F–93
Electrophotometric observations, 10F–49
Elementary meteorology manuals, 10.6–52
Elementary meteorology textbooks, 10.6–26
Energy sources, 10.6–108
Equivalent winds at high levels, 10.6–20
Evaporation, 10.6–246
Evaporation control, 10.6–244
Evaporation from water surfaces, 10.6–244
Evapotranspiration estimates, 10.6–245
Evolutionary effects of climatic changes, 10.6–25
Extended forecasting textbooks, 10.6–11
Extratropical cycles, 10.6–196

F 420 wind equipment, 10.6–31
F layers, 10.6–170
Factor analysis, 10.6–155
Fire weather conditions, 10.6–107
Flash floods, Arctic, 10.6–35
Flood statistics, 10.6–16
Floods, Australia, 10.6–15
Floods, New Zealand, 10.6–16
Florida current, 10.6–68
Forecast terminology, 10.6–66
Forest damage, 10.6–106
Forest effects on precipitation, 10.6–105
Forest micrometeorology, 10.6–295
Freezing of water droplets, 10.6–253
Fruit drying, 10.6–112

Gaseous pollutants, 10F–132
General circulation, 10.6–187
General circulation energetics, 10.6–186
General science teachers manuals, 10.6–52
Geographical Society of the U.S.S.R., Moscow Branch, Meteorology Commission, 10.6–46
Geomagnetic data, 10F–16, 10F–76, 10F–81
Geomagnetic data for Antarctic, 10.6–83
Geomagnetic electrokinetographs, 10.6–68
Geomagnetic research, 10.6–59
Geomagnetic variations, 10F–12
Geostrophic wind computation, 10.6–186
Glacial ablation, 10.6–75
Glacial theories, 10.6–25
Glacier ice, 10.6–76, 10.6–77
Glacier-meteorological research, 10.6–38
Glossaries, 10.6–24
Graphical interpolation of wind isotachs, 10.6–121
Grass microclimatology, 10.6–294
Green flash, 10.6–314
Greenland ice pack, 10.6–76
Greenland ice temperature, 10.6–36
Greenland ice thickness, 10.6–77
Grosswetterlagen climatology, 10.6–13
Ground water-precipitation relationships, 10.6–263
Gustiness measurement, 10.6–136

Hail formation, 10.6–277
Hail mechanism, 10.6–277
Hair hygrometers, 10.6–139
Halo frequency relationships, 10.6–317
Halo-solar activity relationships, 10.6–317
Harmattan, 10.6–164
Heat balance, 10.6–178, 10F–153
Heat balance of atmosphere, 10.6–147, 10.6–175
Heat diffusion equations, 10.6–180
Heat effects on man, 10.6–305
Heavy rainfall data, 10.6–267
High altitude balloons, 10.6–258
High altitude flying, 10.6–50
High altitude radiosonde flights, 10.6–19
High level turbulence, 10F–87
Historic climates, 10.6–291
Historic weather monuments, 10.6–56
History of Mt. Wilson Observatory, Calif., 10.6–55
Horizontal wind divergence nomograms, 10.6–122
Hurricane "Hazel" (1954), 10.6–266
Hurricane rainfall, 10.6–266
Hurricane rainfall patterns, 10.6–17
Hurricane tide forecasting, 10.6–154
Hurricanes, 10.6–23
Hydraulic research projects, 10.6–62
Hydrodynamic temperature computation, 10.6–147
Hydrologic cycle, 10.6–245, 10.6–284
Hydrologic frequency analysis, 10.6–281
Hydrometeor definitions, 10.6–63
Hydrometeorological bibliographies, 10.6–62
Hydrometeorological conferences, 10.6–49
Hygrometer comparison, 10.6–139
Hygrometric charts, 10.6–110
Hygrometric tables, 10.6–110

Ice accumulation-temperature relationships, 10.6–36
Ice depth-density curves, 10.6–77
Ice distribution, 10.6–78
Ice thickness, 10.6–78
Icing of aircraft, 10.6–6
Icing of high speed aircraft, 10.6–97
Indian participation in IGY, 10.6–32
Indoor climates, 10.6–305
Infrared absorption, 10F–25

Infrared absorption spectrum, 10F–70, 10F–90, 10F–162
Infrared radiation transmission, 10F–123
Infrared spectrum atlases, 10F–107
Infrared spectrum of ozone, 10F–48
Insect water loss, 10.6–292
Instrument manuals, 10F–92
International Cloud Atlas, 10.6–63
IGY aurora program, 10.6–34
IGY ozone networks, 10F–71, 10F–111
IGY program, 10.6–32
IGY radiosonde program, 10.6–33
International meteorology codes, 10.6–96
International Ozone Commission, 10F–34
IUUG. Association of Meteorology reports, 10F–34
Iodide nuclei, 10.6–248
Ion concentration, 10.6–320
Ionization during breezes, 10.6–319
Ionosphere control by radio waves, 10.6–171
Ionospheric anomalies, 10.6–170
Ionospheric conductivity, 10.6–320
Ionospheric data, 10.6–42, 10F–16, 10F–76
Ionospheric density, 10.6–84
Ionospheric diffusion, 10.6–172
Ionospheric drift measurements, 10.6–169
Ionospheric electron density computation, 10.6–173
Isobaric surfaces, 10.6–153
Isotach analysis, 10.6–121
Isotropic turbulence, 10.6–195

Jet stream, 10.6–187
Jet stream data, 10.6–188
Jet stream over East Asia, 10.6–269
Jet stream variations, 10.6–239

Kinetic energy spectrum in atmosphere, 10.6–174
Köppen's classification, 10.6–298
Kurile-Kamchatka depression, 10.6–2

Land and sea breezes, 10.6–319
Landscape-climate relationships, 10.6–285
Large scale circulation, 10.6–185
Large scale eddies, 10.6–195
Large scale weather types, 10.6–13
Lee wave theories, 10.6–242
Lettuce, 10.6–100
Light extinction in sea, 10.6–71
Light intensity, 10.6–100
Light scattering in sea, 10.6–71
Lightning damage to aircraft, 10.6–95
Lightning discharges, 10.6–95
Lightning forms, 10.6–323
Lightship observational data, 10.6–129
Linear theories, 10.6–240
Local circulation, 10.6–176
Local forecasting studies, 10.6–94
Long period records, 10.6–132
Low frequency wave spectra, 10.6–73, 10.6–74
Low temperature effects on stored apples, 10.6–111
Lunar eclipses, 10F–24, 10F–29, 10F–72, 10F–126

Magnetic disturbances in high latitude, 10.6–82
Magnetic equator, 10.6–170
Magnetic pulsations, 10.6–80
Mammatus clouds, 10.6–255
Marine biology, 10.6–2
Marine meteorology textbooks, 10.6–10
Mathematical techniques, 10F–48
Maximum precipitation data, 10.6–266
Maximum snow loads in Canada, 10.6–109
Medical climatology, 10.6–117
Medical climatology conferences, 10.6–51
Meridional circulation, 10.6–189
Meridional temperature profiles, 10.6–188
Mesoanalysis, 10.6–148
Mesoclimatology, 10.6–271
Mesosphere, 10F–134
Meteor showers, 10.6–126
Meteorites, 10.6–88
Meteoritic shower effect on rainfall, 10.6–250
Meteorological conferences, 10.6–50
Meteorological films, 10.6–52
Meteorological navigation, 10.6–10
Meteorological observations on Fröya Glacier, 10.6–75
Meteorological research institutes, 10.6–44
Meteorology for pilots, 10.6–8
Methane spectrograms, 10F–107
Microclimatic influences on telescopes, 10.6–293
Microclimatological research, 10.6–47
Monsoon circulation, 10.6–183
Monsoon clouds, 10.6–254

National laboratories, 10.6–44
Network densities, 10.6–145
Netherlands lightships, 10.6–129
Night airglow, 10.6–204
Night airglow Čerenkov radiation, 10.6–7
Nitrogen oxide photolysis, 10F–73
Nitrogen oxides in atmosphere, 10F–124
Nitrogen peroxide in atmosphere, 10F–121
Nitrous oxide spectrograms, 10F–107
Nocturnal temperatures, 10.6–100
Nomogram for calculating wind divergence, 10.6–122
Nonadvective temperature change, 10.6–179
Northwesters, 10.6–197
Nuclei and humidity, 10.6–249
Nuclei effectiveness, 10.6–248
Nuclei growth, 10.6–249

Obituary of J. A. Fleming, 10.6–59
Objective aviation forecasts, 10.6–94
Observational data, 10.6–43
Observers manuals, 10.6–103
Ocean-atmosphere interaction, 10.6–252
Ocean current measurement, 10.6–69
Ocean wave energy, 10.6–67
Ocean wave recorders, 10.6–70, 10.6–73, 10.6–74
Oceanographic chemistry of Northwest Pacific, 10.6–2
Oceanography textbooks, 10.6–10
Odessa Hydrometeorological Institute, 10.6–45
Optical refraction in air, 10.6–198
Orographic influences, 10.6–183
Oxidation meters, 10F–137
Ozone, 10F–112, 10F–120, 10F–141, 10F–142
Ozone absorption, 10F–18, 10F–25, 10F–26, 10F–66, 10F–127, 10F–133

Ozone absorption coefficients, 10F–70, 10F–98, 10F–105
Ozone absorption spectra, 10F–50
Ozone advection, 10F–62
Ozone advection from Arctic, 10F–38
Ozone amount, 10F–68, 10F–102, 10F–136
Ozone bibliographies, 10F–46, 10F–69, 10F–106, 10F–112
Ozone concentration, 10F–1, 10F–21, 10F–23, 10F–118, 10F–135, 10F–150
Ozone concentration effects on tobacco leaves, 10F–155
Ozone concentration in factories, 10F–33
Ozone concentration measurement, 10F–156
Ozone conferences, 10F–51
Ozone content of air, 10F–151
Ozone correlations, 10F–35
Ozone data, 10F–3, 10F–16, 10F–28, 10F–32, 10F–44, 10F–45, 10F–76, 10F–138, 10F–139, 10F–147, 10F–148
Ozone determination, 10F–74
Ozone distribution, 10F–5, 10F–29, 10F–7, 10F–8, 10F–18, 10F–38, 10F–57, 10F–83, 10F–97
Ozone effects on animals, 10F–33
Ozone effects on balloons, 10F–159
Ozone effects on global radiation, 10F–166
Ozone effects on humans, 10F–145, 10–F165
Ozone-500 mb height relationships, 10F–62
Ozone formation, 10F–73, 10F–75, 10F–124
Ozone height distribution, 10F–24
Ozone in Arctic, 10F–53
Ozone in smog, 10F–6, 10F–42
Ozone in troposphere, 10F–31, 10F–50
Ozone layer, 10F–15, 10F–17, 10F–111, 10F–161
Ozone layer height, 10F–61
Ozone layer measurement, 10F–30, 10F–60, 10F–89
Ozone layer temperatures, 10F–10
Ozone measurement during eclipses, 10F–49
Ozone measurement techniques, 10F–9, 10F–22, 10F–26, 10F–44, 10F–65, 10F–81, 10F–84, 10F–94, 10F–129, 10F–137, 10F–158, 10F–164
Ozone measurements, 10F–13, 10F–21, 10F–47, 10F–49, 10F–82, 10F–88, 10F–101, 10F–121
Ozone meters, 10F–122, 10F–156
Ozone near the ground, 10F–43, 10F–83, 10F–100, 10F–117
Ozone networks, 10F–34
Ozone observations, 10F–10, 10F–59, 10F–68
Ozone photochemistry, 10F–63, 10F–64, 10F–143
Ozone radiational heating, 10F–134
Ozone recorders, 10F–150
Ozone records, 10F–112
Ozone research, 10F–19, 10F–56
Ozone-solar activity relationships, 10F–48
Ozone spectrograms, 10F–107
Ozone spectrometers, 10F–42
Ozone spectrophotometers, 10F–92
Ozone spectroscopy, 10F–39, 10F–67, 10F–78, 10F–86
Ozone symposia, 10F–71
Ozone temperature, 10F–8
Ozone-thunderstorm relationships, 10F–23, 10F–125
Ozone transport, 10F–113
Ozone variations, 10F–13, 10F–20, 10F–35, 10F–37, 10F–54, 10F–77, 10F–80, 10F–89, 10F–99, 10F–110, 10F–114
Ozone variations during eclipse, 10F–95
Ozone vertical distribution, 10F–9
Ozone-weather relationships, 10F–27, 10F–44, 10F–140, 10F–161, 10F–168
Ozonesonde data, 10F–116
Ozonesondes, 10F–103, 10F–109, 10F–116, 10F–152
Ozonosphere, 10F–69
Ozonosphere heating, 10F–153
Ozonosphere temperature variations, 10F–14
Ozonosphere temperatures, 10F–40, 10F–41, 10F–57

P test, 10.6–304
Paleoclimatology, 10.6–290
Photochemical reactions in urban air, 10F–52, 10F–143
Photochemical theory of ozone, 10F–11, 10F–20
Photodissociation of hydrocarbons, 10F–31
Photodissociation of oxygen, 10.6–166
Photoelectric counters, 10F–164
Photoelectric photometers, 10F–47
Photoelectric spectrometers, 10F–22
Physico-chemical processes, 10.6–302
Physiological climatology, 10.6–302
Physiological heat balance, 10.6–302
Pilot balloon ascension rates, 10.6–134
Polar displacement, 10.6–290
Polar displacement theories, 10.6–25
Polarization angle of secondary scattering, 10.6–199
Polarization tables, 10.6–199
Polish Academy of Science, Institute of Geography, 10.6–47
Pollen control, 10.6–294
Pollen washout by rain, 10.6–165
POMAR reports, 10.6–96
Popular meteorology, 10.6–24
Popular science books, 10.6–21
Potential evapotranspiration, 10.6–279
Power spectrum analysis, 10F–48
Precipitation at sea, 10.6–262
Precipitation-evaporation (P-E), 10.6–246
Precipitation gage comparisons, 10.6–144
Precipitation regime, 10.6–264
Precipitation singularities, 10.6–269
Pressure data, 10.6–132
Pressure distribution, 10.6–151
Probability forecasts, 10.6–145 to 10.6–149
Progress in meteorology, 10.6–102
Progress in meteorology, 10.6–102
Project Santa Barbara, 10.6–161
Public health, 10F–43

Radar analysis of rain, 10.6–125
Radar analysis of thunderstorms, 10.6–125
Radar attenuation due to tropical cyclones, 10.6–123
Radar echoes from auroras, 10.6–127
Radiation balance, 10.6–178
Radiation computations, 10F–166

Radiation hazards, 10.6–116
Radiation cooling, 10F–133
Radiational temperature change, 10F–133
Radio meteor observation techniques, 10.6–126
Radio theodolite protractors, 10.6–137
Radioactive fallout effects, 10.6–116
Radioactive fallout sampling, 10.6–247
Radiosonde balloon drag, 10.6–135
Rain composition, 10.6–272
Rain from nonfreezing clouds, 10.6–273
Raindrop size distribution, 10.6–273
Raindrop size distribution instruments, 10.6–142
Rainfall data for India, 10.6–280
Rainfall depth-area-duration studies, 10.6–266
Rainfall distribution, 10.6–271
Rainfall intensity data, 10.6–261, 10.6–267
Rainfall intensity-duration frequency, 10.6–15
Rainfall regime, 10.6–260
Rainfall variations, 10.6–274
Rainwater analysis, 10.6–272
Rawin techniques, 10.6–124
Recombination in nitrogen, 10.6–168
Refractive index gradients, 10.6–312
Regional climatology, 10.6–289
Relative humidity, 10.6–139
Reservoir effect on water balance, 10.6–284
Reservoirs, 10.6–49
River shipping, 10.6–49
Rocket communication systems, 10.6–87
Rocket data, 10.6–166
Rocket flights, 10.6–90
Rocket instrumentation, 10.6–92
Rocket measurements, 10.6–87, 10.6–88
Rocket measurements in Arctic, 10.6–39
Rocket measurements in ionosphere, 10.6–172
Rocket research, 10F–11
Rocket soundings, 10.6–85, 10.6–91, 10F–7, 10F–8
Rotating beam ceilometers, 10.6–30
Rotational ozone spectrum, 10F–67, 10F–154
Rubber cracking, 10F–1, 10F–64, 10F–159
Runoff data, 10.6–283
Runoff distribution with elevation, 10.6–282
Runoff regime, 10.6–284

Salt spray effects on seaplanes, 10.6–99
Satellite instrumentation, 10.6–92
Satellite observations, 10.6–85
Satellite observatories, 10.6–86
Satellite ozone observation, 10F–167
Satellite tracking, 10.6–84
Scavenging by rain, 10.6–165
Scintillation, 10.6–313
Sea ice effects on water level, 10.6–79
Sea level pressure forecasting, 10.6–155
Sea level variations, 10.6–79
Sea salt nuclei, 10.6–247
Sea spray nuclei distribution, 10.6–300
Sea spray sampling, 10.6–247
Seasonal ozone variations, 10F–18, 10F–62, 10F–97, 10F–108
Secular geomagnetic variations, 10.6–81
Sedimentation of erythrocytes, 10.6–304
Severe storms, England (Nov. 4, 1957), 10.6–190
Shackleton Antarctic expeditions, 10.6–57
Shielded precipitation gages, 10.6–144
Short range forecast research, 10.6–151
Silver iodide smoke generators, 10.6–161
Sky colors, 10.6–316
Sky radiation, 10.6–315
Smog, 10F–43, 10F–52
Smog formation, 10F–6
Snow cover depth, 10.6–276
Snow cover distribution with elevation, 10.6–276
Snow crystal structure, 10.6–257
Snow sampling instruments, 10.6–143
Snow sondes, 10.6–143
Snowflake collision frequencies, 10.6–275
Snowflake velocities, 10.6–275
Sodium emission, 10.6–200
Solar constant, 10F–7
Solar corpuscular influences on upper atmosphere, 10.6–3
Solar driers, 10.6–112
Solar eclipse effects on ozone, 10F–160
Solar eclipse effects on ozone amount, 10F–146
Solar eclipse, June 30, 1954, 10.6–307, 10F–95
Solar eclipses, 10.6–315, 10F–59
Solar energy utilization, 10.6–1, 10.6–112
Solar influences on physicochemical reactions, 10.6–303
Solar influences on precipitation of chemicals, 10.6–302
Solar-ionospheric relationships, 10.6–3
Solar research, 10.6–55
Solar spectrum, 10F–86, 10F–107
Solar-weather relationships, 10.6–306
Soviet exploration of the upper atmosphere, 10.6–89
Soviet forecasting techniques, 10.6–11
Soviet instruction manuals, 10.6–103
Soviet meteorological rocket, 10.6–89
Soviet satellites, 10.6–85
Space flights, 10.6–4
Spectral reflectivity, 10.6–316
Spectrophotometric ozone determination, 10F–82, 10F–144, 10F–146
Spiral geomagnetic disturbance patterns, 10.6–82
Standard deviation of upper air temperature, 10.6–18
Statistical analysis of hydrologic data, 10.6–278
Statistical analysis of pressure data, 10.6–132
Statistical analysis of rainfall, 10.6–265
Statistics in climatology, 10.6–120
Storm damage, 10.6–190
Storm floods, 10.6–194
Storm surge forecasting, 10.6–196
Storm surge models, 10.6–72
Storm surges, 10.6–154, 10.6–194
Storm tides, 10.6–192, 10.6–194
Stratospheric warming, Jan. 1958, 10F–149
Stratospheric winds, 10F–17, 10F–54
Summer climate-tropopause height relationships, 10.6–167
Sunspot effects on rainfall, 10.6–306

Surface ozone determination, 10F–123
Surface runoff, 10.6–283
Synoptic analysis aids, 10.6–150
Synoptic climatology, 10.6–14, 10.6–297
Synoptic conditions for instability lines, 10.6–148
Synoptic conditions for rainfall, 10.6–270
Synoptic observation of atatmospheric electricity, 10.6–318

Takata reaction, 10.6–307
Tateno Aerological Observatory, 10F–101
Teaching of agrometeorology, 10.6–53
Temperature changes, 10F–57
Temperature effects on evaporation, 10.6–244
Temperature effects on plant growth, 10.6–104
Temperature over heated surface, 10.6–241
Temperature-ozone amount relationships, 10F–134
Temperature-pressure relationships, 10.6–181
Temperature variations, 10.6–37
Textbooks, 10F–142, 10F–161
Thermal convection, 10.6–185
Thornthwaite's index, 10.6–279
Thornthwaite's method, 10.6–245
Thunderstorm activity, 10F–23
Thunderstorm electricity, 10.6–322
Topographic influences, 10.6–184
Training in meteorology, 10.6–54
Translations, 10.6–14
Transmission coefficients, 10F–26
Transparency meters, 10.6–71
Transverse component of the Florida Current, 10.6–68
Tropical analysis, 10.6–150
Tropical climates, 10.6–22
Tropical clouds, 10.6–256
Tropical landscapes, 10.6–22
Tropical storm frequency data, 10.6–191
Tropical wave storms, 10.6–193
Tropopause height variations, 10.6–167
Tropospheric ozone, 10F–126
Turbulence above ozone layer, 10F–87
Turbulence forecasting, 10.6–98
Turbulence in the upper troposphere, 10.6–195
Turbulent transfer of energy, 10.6–177
25 mb temperature anomalies, 10F–149
Twilight luminescence, 10.6–200
Twilight Na, 10F–16
Typhoon forecasting, 10.6–123

Ultraviolet absorption, 10F–2, 10F–66
Ultraviolet absorption by ozone, 10F–134
Ultraviolet radiation, 10.6–315, 10F–130
Ultraviolet radiation measurement techniques, 10F–163
Umkehr effect, 10F–2, 10F–96, 10F–105, 10F–115, 10F–128
Umkehr effect evaluation, 10F–93
Umkehr theory, 10F–119
U. S. satellites, 10.6–85
Upper air chart analysis, 10.6–150
Upper air climatology data, 10.6–18
Upper air data, 10F–148
Upper air pressure-ozone amount relationships, 10F–102
Upper air temperature data, 10.6–19
Upper air temperature extremes, 10.6–18
Upper air temperature measurement, 10F–39
Upper air wind computation techniques, 10.6–137
Upper air wind data, 10.6–19, 10.6–133
Upper air wind variations, 10.6–187
Upper atmosphere physics, 10.6–166
Upper atmosphere research, 10.6–90, 10.6–91, 10F–72
Upper atmosphere research, 10.6–90, 10.6–91, 10F–72
Upper atmospheric composition, 10F–11

Vertical acceleration, 10.6–136
Vertical current measurement, 10.6–134
Vertical current theory, 10.6–176
Vertical exchange of momentum, 10.6–182
Vertical motion, 10.6–240
Vertical ozone distribution, 10F–9, 10F–30, 10F–36, 10F–56, 10F–58, 10F–60, 10F–62, 10F–72, 10F–79, 10F–91, 10F–94, 10F–104, 10F–105, 10F–113, 10F–118, 10F–119, 10F–126, 10F–130, 10F–138, 10F–144, 10F–162, 10F–163, 10F–165, 10F–167
Vertical ozone distribution calculation, 10F–115, 10F–128, 10F–131
Vertical ozone distribution measurement, 10F–55
Vertical ozone profile, 10F–117
Vertical velocities, 10.6–240
Vertical wind velocity measurement, 10.6–136
Vibretron transducers, 10.6–73
"Vitiaz" Expedition, 1953–55, 10.6–2
Visibility, 10.6–310
Visibility in fog, 10.6–311
Visual acuity, 10.6–310
VODARO parameters, 10F–131

Warming-cloudiness relationships, 10.6–179
Water balance data, 10.6–279
Water level recorders, 10.6–49
Water resources, 10.6–283
Water vapor vertical distribution, 10.6–243
Wave heights, 10.6–196
Waves in the westerlies spectra, 10.6–186
Weather anomalies, 10.6–128
Weather conditioning of houses, 10.6–29
Weather effects on asthma, 10.6–118
Weather effects on atmospheric electricity, 10.6–321
Weather effects on blood, 10.6–119
Weather effects on diseases, 10.6–117, 10.6–119
Weather effects on ozone amounts, 10F–110
Weathering of plastics, 10.6–113
Wind damage to forests, 10.6–106
Wind indicator instruction manuals, 10.6–31
Wind power projects, 10.6–115
Wind stress on sea surface, 10.6–72
Wind tides, 10.6–79
Wind velocity data, 10.6–115
World disease maps, 10.6–117

Zonal transfer of momentum, 10.6–182

INDEX OF GEOGRAPHICAL LOCATIONS

AFRICA
Belgian Congo, 10.6–305
Nigeria
Ibadan, 10.6–164
Tunisia, 10.6–299
ASIA, 10.6–187
Far East, 10.6–239

Afghanistan
Kabul, 10F–10
China, 10.6–183, 10.6–269
Tibetan Plateau, 10.6–184
India, 10.6–32, 10.6–261, 10.6–279, 10.6–280, 10F–1
Calcutta, 10.6–197
Jhelum River Basin, 10.6–260
Khandala, 10.6–254
Kodaikanal, 10F–76
Minicoy, 10.6–267
Mount Abu, 10F–80
Poona, 10F–14
Saurashtra, 10.6–115
Iraq, 10.6–287
Japan, 10.6–167, 10F–139
Izuhara, 10.6–265
Kagoshima, 10.6–263
Kanagawa Prefecture, 10.6–271
Mt. Fuji, 10F–21
Rebun Island, 10.6–315
Shimane Prefecture, 10.6–274
Soya District, 10.6–270
Tateno, 10F–99, 10F–101, 10F–110, 10F–122, 10F–138, 10F–147, 10F–148
Tokyo, 10.6–259, 10F–13, 10F–68, 10F–102
Pakistan, 10.6–279
Quetta, 10F–59
Turkey, 10.6–118
U.S.S.R. (in Asia), *See also* U.S.S.R. *under* Europe
Altai Region, 10.6–268
Kazakh, 10.6–268
Alma-Ata, 10F–2, 10F–27
Kzylcha River Valley, 10.6–276
Siberia
Dickson Island, 10.6–82
Noril'sk District (Krasnoyarsk Territory), 10.6–35
Verkhoyansk, 10.6–41
AUSTRALASIA
Australia, 10.6–15
Macquarie Island, 10.6–42
New South Wales
Riverina District, 10.6–107
South Australia
Adelaide, 10.6–126, 10.6–127
New Zealand, 10.6–16
Wellington, 10F–3
EUROPE
Austria
Zugspitze, 10F–37
Baltic Sea, 10.6–78
Bay of Bothnia, 10.6–79
Belgium, 10.6–120
Bulgaria, 10.6–124
Czechoslovakia
Brno-Pisarky, 10.6–132
England, 10.6–190
Ascot, 10F–136
Cambridge, 10F–89
Exmoor, 10.6–285
Germany, 10.6–13, 10F–88
East Germany, 10.6–130, 10.6–133
Fichtelberg, 10F–32
Lindenberg, 10F–45
Ravensburg, 10F–71
Sauerlach (Munich), 10.6–295
Wahnsdorf, 10F–32, 10F–44
Weissenau, 10F–38, 10F–113, 10F–114
Greece, 10.6–56
Hungary, 10.6–264, 10.6–286
Italy
Florence, 10.6–303
Netherlands, 10.6–129, 10.6–131
North Sea, 10.6–129
Norway
Tromsö, 10F–35, 10F–91, 10F–140
Poland, 10.6–47, 10.6–81, 10.6–194, 10.6–246
Suwalki, 10.6–307
Sweden
Uppsala, 10F–146
Switzerland, 10.6–318
Jungfraujoch, 10F–151
Swiss Alps, 10F–100
U.S.S.R. (European and general), 10.6–11, 10.6–14, 10.6–101, 10.6–105
Leningrad, 10F–95
Lower Volga, 10F–168
Moscow, 10F–104
Ukraine, 10.6–297
Transcarpathia, 10.6–282
Zaporozhe, 10.6–159
NORTH AMERICA, 10.6–19
Canada, 10.6–33, 10.6–109, 10.6–283
Alberta
Edmonton, 10F–62
Manitoba
Fort Churchill, 10.6–39
Northwest Territories
Ellesmere Island, 10.6–38
Resolute, 10.6–37
Ontario
Southern Ontario, 10.6–266
Caribbean Region
Bahama Islands, 10.6–31
Puerto Rico, 10.6–256
Windward Islands, 10.6–193
Greenland, 10.6–19, 10.6–30, 10.6–76, 10.6–291
Fröya Glacier, 10.6–75
Northeast Greenland, 10.6–77
United States, 10.6–18, 10.6–23, 10.6–29, 10.6–62, 10.6–128, 10.6–272
East Coast, 10.6–17
Gulf Coast, 10.6–17
Ohio River Basin, 10.6–245
Southern United States, 10.6–28
Western United States, 10.6–28

Alabama, 10.6–285
Alaska
College, 10F–28, 10F–119
Arizona
Flagstaff, 10F–57, 10F–58, 10F–97
Santa Catalina Mts., 10.6–156, 10.6–157
California
Los Angeles, 10F–6, 10F–19, 10E–42, 10F–52, 10F–63, 10F–74, 10F–85
Los Angeles Basin, 10F–124
Mt. Wilson Observatory, 10.6–55
Colorado
Denver area, 10.6–94
District of Columbia (Washington), 10.6–169
Florida, 10.6–162
Florida Coast, 10.6–15

Kentucky
Louisville, 10.6–163
Maine, 10.6–106
Massachusetts
Boston, 10.6–196
Nebraska, 10F–118
O'Neill, 10F–118
New Hampshire, 10.6–106
New Mexico, 10F–19, 10F–118
Albuquerque, 10F–116
Sacramento Peak, 10F–50
White Sands, 10.6–88
New York
Long Island, 10.6–154
North Dakota
Bismarck, 10F–62
Pennsylvania, 10.6–285

SOUTH AMERICA
Brazil
Rio de Janeiro (State), 10.6–298
Ecuador, 10.6–288
Peru
Huancayo, 10.6–206
Venezuela, 10.6–289

OCEANS, SEAS, AND ISLANDS
Antarctic Regions
Antarctic Seas, 10.6–12
Antarctica, 10.6–43, 10.6–83
Amundson-Scott Station, 10.6–41
Mirny, 10.6–40
Arctic Regions
Arctic, 10F–53, 10F–149
Arctic Seas
Norwegian Sea, 10.6–262
Canadian Arctic, 10.6–38
Spitsbergen, 10F–36
Longyear, 10F–16
Atlantic
North Atlantic, 10.6–68, 10.6–314
Pacific
Marcus Island, 10.6–167
Northwestern Pacific, 10.6–2
South Pacific, 10.6–314, 10.6–323
Western Pacific
Ryukyu area, 10.6–123

LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted. The form of serial entry adopted by MAB is given in bold face type below.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

★**Acta Geophysica Polonica,** [Warsaw]
Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington].
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
★**Annalen der Meteorologie,** [Hamburg].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Magazine,** [Melbourne].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorológiai Társaság and Országos Meteorológiai Intézet, [Budapest]
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington].
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorologické Zprávy** [Prague].
★**Meteorological Society of Japan, Journal,** [Tokyo].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologiia i Gidrologiia,** [Leningrad].
★**Meteorologische Rundschau,** [Berlin].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel].
★**Przegląd Geofizyczny,** [Warsaw].
Revista de Geofísica, Instituto Nacional de Geofisica, [Madrid].
★**Rivista di Meteorologia Aeronautica,** Servizio Meteorologico, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa, Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
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★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

TABLE OF CONTENTS

Meteorological Abstracts and Bibliography, Volume 10, Number 6, June 1959

Foreword iii
Explanations iv

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

Major General Works 829
Collected Works 829
Textbooks 830
Monographs and Comprehensive Papers. 832
Popular Meteorology 835
Manuals and Reference Works 837
General Geophysics and Meteorology 838
IGY 838
Arctic Research 838
Antarctic Research 840
Societies and Institutions 841
Conferences and Symposia 842
Education, History and Biography 843
Education 843
History 844
Biography 845
Bibliography and Terminology 846
Practical and Applied Meteorology 847
Oceanography and Marine Meteorology. 847
Glacier Ice and Sea Ice 849
Geomagnetism 850
Astronautics—Satellite Observatories 851
Aeronautical Meteorology 853
Agricultural Meteorology 855
Forest Meteorology and Fire Weather ... 857
Industrial Meteorology 857
Medical Meteorology 860
Meteorological Observations and Instruments 861
Methods of Observation 861
Observational Data 863
Instrument Carriers 865
Instruments 865
Synoptic Analysis and Forecasting 867
Weather control 871
Structure and Physics of the Atmosphere .. 873
Composition of the Atmosphere 873
Atmospheric Pollution 873
Upper Atmosphere—Ionosphere 874
Radioactivity 876
Mechanics and Thermodynamics of the Atmosphere 876
General Circulation 878
Atmospheric Disturbances 881
Radiation and Temperature 882
Radiation 882
Temperature 884
Upper Air Temperature 886
Soil Temperature 886
Water Temperature 887
Pressure and Wind 887
Pressure 887
Gustiness and Turbulence 888
Wind Distribution and Wind Variation .. 889
Vertical Wind Distribution 891
Special Winds and Wind Effects 891
Upper Air Winds 893
Vertical Motion 894
Aqueous Vapor, Hydrometeors and Hydrometeorology 895
Humidity 895
Evaporation and Evapotranspiration 895
Condensation 896
Fog 899
Clouds 899
Precipitation 901
Rain, Snow and Hail 903
Hydrometeorology 906
Climatology and Bioclimatology 908
Climatology 908
Climatic Zones 908
Climate of Particular Places 908
Climatic Changes 909
Microclimatology 910
Climatic Classification 911
Bioclimatology 912
Upper Air Climatology 914
Environmental Influences 914
Synoptic Climatology 914
Miscellaneous 914
Cosmic Influences 914
Visibility 915
Optical Phenomena 915
Electrical Phenomena 917
Auroras 919

PART II. ANNOTATED BIBLIOGRAPHY ON OZONE IN THE ATMOSPHERE (1954–1959)

Introduction 920
Outline of Contents 920
Supplementary Material 956

PART III. REVIEWS, TRANSLATIONS, RECENT MONOGRAPHS AND ANALYTICS FROM RECENT SERIALS AND COLLECTED WORKS

A. Reviews of Recent Important Meteorological Material 958
B. Translations and Recent Monographs 958
C. Meteorological Articles Appearing in Recently Issued Publications 959

PART IV. AUTHOR AND SUBJECT INDEXES

Index of Authors 967
Index of Subjects 971
Index of Geographical Locations 978

List of Periodicals ..... Cover 3